

SOAH DOCKET NO. 582-07-2673
TCEQ DOCKET NO. 2007-0204-WDW
APPLICATION OF TEXCOM GULF) STATE OFFICE OF
DISPOSAL, LLC, FOR TEXAS)
COMMISSION ON ENVIRONMENTAL)
QUALITY UNDERGROUND INJECTION)
CONTROL PERMIT NOS. WDW410,)
WDW411, WDW412 AND WDW413) ADMINISTRATIVE HEARINGS

SOAH DOCKET NO. 582-07-2674
TCEQ DOCKET NO. 2007-0362-IHW
APPLICATION OF TEXCOM GULF) STATE OFFICE OF
DISPOSAL, LLC, FOR TEXAS)
COMMISSION ON ENVIRONMENTAL)
QUALITY INDUSTRIAL SOLID)
WASTE PERMIT NO. 87758) ADMINISTRATIVE HEARINGS

REMANDED HEARING ON THE MERITS
WEDNESDAY, JUNE 16, 2010

BE IT REMEMBERED THAT at 9:04 a.m., on
Wednesday, the 16th day of June 2010, the above-entitled
matter came on for hearing at the State Office of
Administrative Hearings, William P. Clements, Jr.,
Building, 300 West 15th Street, Room 404, Austin, Texas,
before THOMAS H. WALSTON AND CATHERINE C. EGAN,
ADMINISTRATIVE LAW JUDGES, and the following proceedings
were reported by Evelyn Coder, Certified Shorthand
Reporter of:

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Pages 244 - 332

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245	<p style="text-align: center;">P R O C E E D I N G S</p> <p style="text-align: center;">WEDNESDAY, JUNE 16, 2010</p> <p style="text-align: center;">(9:04 a.m.)</p> <p>JUDGE WALSTON: We'll go on the record.</p> <p>This is the continuation of SOAH Docket Nos. 582-07-2673 and 2674, concerning the applications by TexCom Gulf Disposal, LLC.</p> <p>And before we went on the record, Mr. Riley mentioned he had a couple of preliminary matters.</p> <p>MR. RILEY: Yes. When we left yesterday, there were two items that were asked of the applicant. The first was that we provide a clear copy of a formula that was discussed on cross-examination of Mr. Casey yesterday.</p> <p>We did that electronically last evening, and this morning I've given each of you hard copies of the same document we distributed to the parties. When it comes our turn on redirect, it's my expectation that I'll introduce that as an exhibit -- or a TexCom exhibit so that it's clear in the record.</p> <p>The second item was Ms. Mendoza raised a question as to whether she had been provided certain data that is the supporting data for the fall-off test. You'll recall a discussion about a chart in the fall-off</p>	247	<p>1 pace of our schedule so far -- I was hoping it wouldn't come to this, but I've got a prehearing conference before Judge Cloninger on Monday, the 21st, at three o'clock in the afternoon, and I'm playing a substantial role in it, and it's on a contested-case hearing that begins on the 28th. I'm playing a substantial role in the case, and I was hoping perhaps that I wouldn't have to ask for the potential opportunity to bow out to attend that prehearing conference, but now it looks like we're still going to be in the throes of this by Monday afternoon, and so I need to at least raise that issue.</p> <p>To the extent we're still moving forward with the hearing at that point, I may need to ask for an opportunity to attend that prehearing conference.</p> <p>JUDGE WALSTON: That's Monday, the 21st?</p> <p>MR. HILL: Monday, the 21st, at 3 p.m.</p> <p>JUDGE WALSTON: Just keep us posted.</p> <p>MR. HILL: I'll do it.</p> <p>JUDGE WALSTON: If there are no other preliminary matters, we'll resume the hearing.</p> <p>Mr. Casey is on the witness stand.</p> <p>Mr. Casey, I just remind you that you remain under oath.</p> <p>WITNESS CASEY: Yes.</p> <p>JUDGE WALSTON: And Denbury was in the</p>
246	<p>1 test report. Indeed, Ms. Mendoza had that data and has had it since she reviewed production. We provided her copies of the -- she requested copies of certain things that we had produced, and we provided that data some time ago. I don't have a precise date, but I think Ms. Mendoza will confirm that she's had that data prior to the beginning of the hearing.</p> <p>MS. MENDOZA: Yes, I have had that data, and I appreciate counsel pointing out the Bates numbers that is the start of that data so that we were able to confirm it and clear up our confusion yesterday.</p> <p>JUDGE WALSTON: I'll also just note for the record that the ALJs had received a letter from State Representative Creighton and State Senator Nichols, dated June 15, 2010, where they wanted to make comment, and I'll note for the record that a copy of that letter has been provided to all parties this morning.</p> <p>MR. RILEY: Yes, sir. Thank you.</p> <p>MR. HILL: Your Honors, if I may?</p> <p>JUDGE WALSTON: Yes.</p> <p>MR. HILL: I apologize for belaboring any more before we get started, but I've got a preliminary matter that I need to address.</p> <p>Based on what appears to be the apparent</p>	248	<p>1 process of cross-examination. So, Ms. Mendoza, you can proceed.</p> <p>MS. MENDOZA: Thank you.</p> <p>PRESENTATION ON BEHALF OF TEXCOM GULF DISPOSAL, LLC</p> <p style="text-align: center;">(CONTINUED)</p> <p>GREG CASEY,</p> <p>having been previously duly sworn, testified as follows:</p> <p style="text-align: center;">CROSS-EXAMINATION (CONTINUED)</p> <p>BY MS. MENDOZA:</p> <p>Q Good morning, Mr. Casey.</p> <p>A Good morning.</p> <p>Q I know yesterday I had shown you a book, Advances in Well Test Analysis by Robert Earlougher -- I'm not sure I'm saying that correctly -- from 1977, trying to talk about some formulas, and I realized that I probably have another formula to talk to you about.</p> <p>And I was hoping we could short-circuit this and agree upon some formulas in the book. You said you hadn't used this book since college. Is that correct?</p> <p>A No, ma'am; I've used it. I mean, it's in my library of books that I reference from time to time.</p> <p>Q And you cited it, in fact, in your most recent testimony. Correct?</p> <p>A Right. It's one of the books that myself and</p>

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249	<p>1 my staff use as a reference.</p> <p>2 Q So if I were to point to some formulas in</p> <p>3 there, you would probably recognize those formulas. Is</p> <p>4 that correct?</p> <p>5 A Potentially, yes.</p> <p>6 Q And you believe that this book is correct when</p> <p>7 it gives you these formulas?</p> <p>8 A Yes, ma'am.</p> <p>9 Q Thank you. We'll come back to that.</p> <p>10 We had talked yesterday about the core,</p> <p>11 and I was looking for the core report that you had</p> <p>12 talked about using. And I wanted to -- did you have a</p> <p>13 chance last night perhaps or did you perhaps look for</p> <p>14 the core report?</p> <p>15 A No, ma'am.</p> <p>16 Q I have found in the exhibits in the first</p> <p>17 hearing in this matter, as part of Exhibit 11, at</p> <p>18 Page 75, something that is labeled Neighbors PDS</p> <p>19 Crossroads Management WDW315, Montgomery County, Texas,</p> <p>20 at the Well Surfaces, and it has a number of things</p> <p>21 behind it. Would this perhaps be the analysis of the</p> <p>22 core?</p> <p>23 A No, ma'am.</p> <p>24 Q It would not be. What document, then, would I</p> <p>25 look for -- or can you tell me where in the application</p>	251	<p>1 A The core analysis report from Omni starts on</p> <p>2 Page 134.</p> <p>3 Q (BY MS. MENDOZA) Thank you, Mr. Casey.</p> <p>4 JUDGE WALSTON: Just so I'm clear, for the</p> <p>5 record, that's Volume VI of the application?</p> <p>6 A Yes, sir.</p> <p>7 Q (BY MS. MENDOZA) Have you analyzed -- or have</p> <p>8 you reviewed core analysis similar to this one before in</p> <p>9 the course of your work?</p> <p>10 A Yes, ma'am.</p> <p>11 Q Are you familiar with how a core analysis is</p> <p>12 performed?</p> <p>13 A In basic terms, yes.</p> <p>14 Q Have you performed a core analysis before on</p> <p>15 your own?</p> <p>16 A No, ma'am.</p> <p>17 Q Did you review a permeability versus porosity</p> <p>18 plot that was part of the report that you just</p> <p>19 referenced me to?</p> <p>20 A I'm not sure which plot you're speaking to.</p> <p>21 Q If you will look at Page 144 of TexCom</p> <p>22 Exhibit 11, do you recognize that to be a permeability</p> <p>23 versus porosity plot?</p> <p>24 A Yes, that's what it is.</p> <p>25 Q Have you reviewed permeability versus porosity</p>
250	<p>1 the analysis of the core is?</p> <p>2 A I believe it's in Volume VI of the TexCom</p> <p>3 application.</p> <p>4 Q Is Exhibit 11 part of the TexCom application?</p> <p>5 A I don't know what Exhibit 11 is, ma'am.</p> <p>6 MS. MENDOZA: Your Honor, may I approach</p> <p>7 the witness?</p> <p>8 JUDGE WALSTON: Yes.</p> <p>9 A Yes. This is part of Volume VI.</p> <p>10 Q (BY MS. MENDOZA) This is part of Volume VI of</p> <p>11 the application?</p> <p>12 A Yes, ma'am.</p> <p>13 Q Somewhere else in this Volume VI, though, I</p> <p>14 will find the core analysis?</p> <p>15 A Yes, ma'am.</p> <p>16 Q Let me hand you back this part of Volume VI.</p> <p>17 MR. RILEY: We really would like to follow</p> <p>18 along.</p> <p>19 MS. MENDOZA: Yes. I am on TexCom</p> <p>20 Exhibit No. 11, Page 76.</p> <p>21 Q (BY MS. MENDOZA) This volume begins as TexCom</p> <p>22 Exhibit 11, Page 1, and it goes apparently through</p> <p>23 Page 270. Mr. Casey, can you please, look through what</p> <p>24 has been marked as TexCom Exhibit 11 and identify for me</p> <p>25 the core analysis that we were talking about yesterday?</p>	252	<p>1 plots before in the course of your work?</p> <p>2 A I have looked at them. I don't spend a lot of</p> <p>3 time with them; no, ma'am.</p> <p>4 Q If you look at the permeability versus porosity</p> <p>5 plot that I just referred you to on Page 144 of</p> <p>6 Exhibit 11 --</p> <p>7 JUDGE EGAN: Is it 134?</p> <p>8 MS. MENDOZA: I'm sorry. 144 of TexCom</p> <p>9 Exhibit 11.</p> <p>10 Q (BY MS. MENDOZA) Along the X axis, that is the</p> <p>11 bottom horizontal action, you will see porosity</p> <p>12 expressed as a percent. Correct?</p> <p>13 A Yes.</p> <p>14 Q Will you locate on the X axis 24 percent? Have</p> <p>15 you done that?</p> <p>16 A Yes, ma'am.</p> <p>17 Q And if you trace that up, what permeability</p> <p>18 does that correlate to on this permeability versus</p> <p>19 porosity plot?</p> <p>20 A Approximately 74.</p> <p>21 Q Did you use 74 millidarcies in any of your</p> <p>22 modeling that you have submitted in this case?</p> <p>23 A Well, this plot --</p> <p>24 Q Mr. Casey, my question --</p> <p>25 A This plot is not for the injection zone.</p>

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253	<p>1 Q Mr. Casey, I just wanted to ask you, did you</p> <p>2 use 74 millidarcies in any model that you have submitted</p> <p>3 in this case?</p> <p>4 A No, ma'am.</p> <p>5 Q Mr. Casey, on the Page 144, of TexCom</p> <p>6 Exhibit 11, there are five black dots.</p> <p>7 Do you know what those five black dots</p> <p>8 are?</p> <p>9 A Off the top of my head; no, ma'am.</p> <p>10 Q Mr. Casey, if you will, flip over to Page 146</p> <p>11 of TexCom Exhibit 11. Am I correct when I look at</p> <p>12 Page 146 of TexCom Exhibit 11 I am seeing an analysis of</p> <p>13 five different samples?</p> <p>14 A Yes, ma'am.</p> <p>15 Q And those five different samples are taken at</p> <p>16 specific depths. Is that correct?</p> <p>17 A That is correct.</p> <p>18 Q And these five samples were taken from WDW315.</p> <p>19 Is that correct?</p> <p>20 A That is correct.</p> <p>21 Q And back on Page 144, we have five different</p> <p>22 dots. Is that correct?</p> <p>23 A Yes, ma'am.</p> <p>24 Q Do those five dots in any way, shape or form</p> <p>25 relate to the five samples that are on Page 146?</p>	255	<p>1 Q Would it be in one of your reports?</p> <p>2 A Yes, should be in the fall-off test report.</p> <p>3 Q Is that part of your prefiled testimony that</p> <p>4 you entered yesterday?</p> <p>5 A Yes, ma'am.</p> <p>6 Q Can you pull that out and take a look at it for</p> <p>7 me, please?</p> <p>8 A (The witness complied.)</p> <p>9 Q Mr. Casey, while you're looking, can you tell</p> <p>10 my what exhibit you're looking at?</p> <p>11 A Currently Exhibit No. 91.</p> <p>12 Q Thank you.</p> <p>13 A I don't think the pressure is specifically</p> <p>14 called out in the report. It would be in the data.</p> <p>15 Q Is this the same data we were talking about</p> <p>16 yesterday and you-all pointed me to last night?</p> <p>17 A Yes, ma'am.</p> <p>18 Q Then we'll pass on that for a little bit.</p> <p>19 Let's go back to Exhibit 11 that we were</p> <p>20 talking about. What was the size of the core that was</p> <p>21 taken in the lower Cockfield in height?</p> <p>22 A I don't actually remember off the top of my</p> <p>23 head, ma'am.</p> <p>24 Q Are you able to look through there and verify</p> <p>25 that they took approximately 14 feet of core?</p>
254	<p>1 A Yes, they do.</p> <p>2 Q Will you please now flip back to Page 146 and</p> <p>3 tell me at what depth was Sample No. 1 taken?</p> <p>4 A 6,071.52.</p> <p>5 Q And Sample No. 2 was taken at what depth?</p> <p>6 A 6,073.25.</p> <p>7 Q And Sample 3 was taken at what depth?</p> <p>8 A 6,077.55.</p> <p>9 Q And Sample 4 was taken at what depth?</p> <p>10 A 6,080.2.</p> <p>11 Q And Sample 5 was taken at what depth?</p> <p>12 A 6,082.96.</p> <p>13 Q And I believe yesterday you testified that the</p> <p>14 lower Cockfield was from 6,045 feet to 6,390 feet. Is</p> <p>15 that correct?</p> <p>16 A Yes, ma'am.</p> <p>17 Q So all five of these samples that are</p> <p>18 represented on the permeability to porosity log on</p> <p>19 Page 144 of TexCom Exhibit 11 were, in fact, taken in</p> <p>20 the lower Cockfield as you defined the lower Cockfield?</p> <p>21 A Yes, ma'am.</p> <p>22 Q Thank you. What bottomhole pressure did you</p> <p>23 find in the lower Cockfield?</p> <p>24 A Off the top of my head, I couldn't tell you,</p> <p>25 ma'am.</p>	256	<p>1 JUDGE WALSTON: Can you refer him to a</p> <p>2 page if you know the page?</p> <p>3 MS. MENDOZA: I am looking for that as</p> <p>4 well myself.</p> <p>5 A On Page 147, the gamma ray plot is all the</p> <p>6 core, which I can't tell for sure if it is, but it shows</p> <p>7 to be about 14 -- a little over 14 feet.</p> <p>8 Q (BY MS. MENDOZA) Okay. About 14 feet of core.</p> <p>9 And from that 14 feet of core, they took five plug</p> <p>10 samples?</p> <p>11 A I believe so; yes, ma'am.</p> <p>12 Q Are you aware of how they took these plug</p> <p>13 samples?</p> <p>14 A Not offhand. I wasn't there when they did it.</p> <p>15 Q Are you aware of the concept of slabbing a</p> <p>16 core?</p> <p>17 A Yes, ma'am.</p> <p>18 Q Did they take these core samples before or</p> <p>19 after they slabbed the core?</p> <p>20 A I don't know.</p> <p>21 Q How big were these plug samples that were taken</p> <p>22 from the core?</p> <p>23 A I don't know, ma'am.</p> <p>24 Q How big would they be typically?</p> <p>25 A Typically about an inch.</p>

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257	<p>1 Q So out of a 14-foot core, they have taken five 2 inches of sampling?</p> <p>3 A Yes, ma'am.</p> <p>4 Q And the lower Cockfield is 350 feet thick?</p> <p>5 A Correct.</p> <p>6 Q We have five inches of sampling from 350 feet 7 of your injection interval. Is that correct?</p> <p>8 A Correct.</p> <p>9 Q Do you know how they selected the five 10 locations from which they took these samples?</p> <p>11 A No, ma'am.</p> <p>12 Q Mr. Casey, I want to refer you -- I think I'm 13 probably done with Exhibit 11 so we can clear off some 14 of the documents there in front of you.</p> <p>15 I want to now refer you back to the well 16 test that we were talking about earlier, TexCom 17 Exhibit 91, which is a part of your testimony. 18 Yesterday I believe that you testified that the specific 19 gravity of the fluid you injected was 1.18. Is that 20 correct?</p> <p>21 A Let's see.</p> <p>22 Q I believe it's on Page 23 of Exhibit 91.</p> <p>23 A Yes, it was.</p> <p>24 Q And would you calculate that by dividing the 25 9.9 pounds per gallon as the brine weight by the density</p>	259	<p>1 it by 8.3, I get 1.1928. Does that sound like an 2 accurate answer for the specific gravity of what you 3 injected?</p> <p>4 A We used 1.18, ma'am.</p> <p>5 Q You used 1.18?</p> <p>6 A Yes.</p> <p>7 Q So you used some other number than 8.3 for the 8 density of water?</p> <p>9 A Ma'am, I didn't make the calculation. Dr. Mark 10 did.</p> <p>11 Q You sealed TexCom Exhibit No. 91?</p> <p>12 A Excuse me?</p> <p>13 Q You sealed TexCom Exhibit No. 91?</p> <p>14 A Yes, ma'am.</p> <p>15 Q You supervised this work?</p> <p>16 A Yes, I did.</p> <p>17 Q You've submitted to it and have testified that 18 it is accurate?</p> <p>19 A Yes, I have.</p> <p>20 Q Did you just recalculate what the specific 21 gravity is of what you injected?</p> <p>22 A Yes, I did; and using 8.4, it's 1.179.</p> <p>23 Q So you used then in your calculations the 24 density of water of 8.4?</p> <p>25 A I believe that's the number to use; yes, ma'am.</p>
258	<p>1 of water? Is that correct?</p> <p>2 A It was either done that way or through a table. 3 I'm not sure which. My modeling engineer took care of 4 that.</p> <p>5 Q And your modeling engineer is whom?</p> <p>6 A Dr. Mark Layne.</p> <p>7 Q Do you know how Dr. Mark Layne calculated this?</p> <p>8 A Offhand; no, ma'am.</p> <p>9 Q What is the density of water?</p> <p>10 A Density of water is .33.</p> <p>11 JUDGE EGAN: I'm sorry. I couldn't hear.</p> <p>12 Q (BY MS. MENDOZA) I'm sorry. I'm asking in 13 pounds per gallon.</p> <p>14 A Pounds per gallon, it's 8.3, 8.4.</p> <p>15 MR. RILEY: Judge, did you want the prior 16 answer?</p> <p>17 JUDGE EGAN: I'm sorry. I'm just having 18 trouble hearing, Mr. Casey.</p> <p>19 A I'm sorry. I'm talking that way.</p> <p>20 JUDGE EGAN: Just, if you could, speak up 21 a little bit.</p> <p>22 A .33, or in pounds per gallon, it would be 23 8.4 -- 8.3, 8.4 per gallon.</p> <p>24 JUDGE EGAN: Okay. Thank you.</p> <p>25 Q (BY MS. MENDOZA) When I take 9.9 and I divide</p>	260	<p>1 Q And do you know how he determined the 2 9.9 pounds per gallon?</p> <p>3 A I believe he took it off the pressure 4 measurements on the way out of the hole.</p> <p>5 Q And I just want to clarify. When you say "on 6 the way out of the hole," that's as you-all were 7 bringing the brine back up?</p> <p>8 A Sorry. When we were bringing the bottomhole 9 pressure tool up out of the well, we did pressure 10 gradient stops.</p> <p>11 Q So you measured the weight of your injectate as 12 you were bringing the pressure tool out of the hole. Is 13 that correct?</p> <p>14 A Correct. It was a hole standing full of fluid 15 that we injected. We made pressure gradient stops, and 16 we compared that with the information that was supplied 17 to us by our -- the company who provided the brine who 18 told it was a 9.9 pound per gallon, and we verified that 19 number by doing the pressure gradient stops.</p> <p>20 Q I've read through Exhibit No. 91, and I see 21 where on Page 4 it says the brine rate was 9.9 pounds 22 per gallon based on calculations from the well pressure 23 gradient.</p> <p>24 I do not see where it says that Texas 25 Brine Corporation told you it was a 9.9 pound per gallon</p>

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261	<p>1 brine. Is that written somewhere in this report?</p> <p>2 A No, it's not.</p> <p>3 Q So that's information about this test that is</p> <p>4 not in this report?</p> <p>5 A Correct.</p> <p>6 Q Were you on site while this -- while the test</p> <p>7 that is reflected in TexCom Exhibit No. 91 was</p> <p>8 performed?</p> <p>9 A Yes, ma'am.</p> <p>10 Q And did you check the weight of the injectate</p> <p>11 before it was placed in WDW315?</p> <p>12 A Yes. I mean, you know, I talked to the folks</p> <p>13 at Texas Brine. They told me what they brought me, and</p> <p>14 then we used a mud scale to check it, and it was within</p> <p>15 the area of 9.9 pounds per gallon.</p> <p>16 Q And is there a discussion in TexCom Exhibit</p> <p>17 No. 91 of the mud scale?</p> <p>18 A No. There was no need to put it in the report.</p> <p>19 Q Do you know how the 190.6 millidarcy</p> <p>20 permeability was calculated in exhibit -- TexCom Exhibit</p> <p>21 No. 91?</p> <p>22 A Yes. Dr. Mark has a program he uses to do</p> <p>23 fall-off test analysis, and by inputting the data, it</p> <p>24 presents the permeability.</p> <p>25 Q Mr. Casey, do you know how it was calculated?</p>	263	<p>1 a look at this book and specifically perhaps at Equation</p> <p>2 7.9.</p> <p>3 A (The witness complied.)</p> <p>4 Q Have you been able to find Equation 7.9?</p> <p>5 A I believe so. If you know which equation you</p> <p>6 want me to look at, would you mind pointing it out?</p> <p>7 Because I know it says 7.9, but I want to make sure</p> <p>8 we're on the same page.</p> <p>9 Q Yes. I would be happy to.</p> <p>10 MR. RILEY: And I hate to be a stick in</p> <p>11 the mud, but can I have a look before we begin answering</p> <p>12 questions?</p> <p>13 MS. MENDOZA: Yes.</p> <p>14 JUDGE WALSTON: Yes. I was going to</p> <p>15 state, Ms. Mendoza, just for the record, can you state</p> <p>16 the title of the book and the authors and the edition,</p> <p>17 if there is an edition number, just so we'll know what</p> <p>18 he's referring to on the record?</p> <p>19 MS. MENDOZA: Yes, Your Honor.</p> <p>20 Q (BY MS. MENDOZA) Mr. Casey, we're looking at a</p> <p>21 book called Advances in Well Test Analysis by Robert C.</p> <p>22 Earlougher -- and I'm probably saying that incorrectly</p> <p>23 so I'll spell it -- E-A-R-L-O-U-G-H-E-R. And it is</p> <p>24 copyrighted 1977. Is that correct?</p> <p>25 A Yes.</p>
262	<p>1 A In theory; yes, ma'am.</p> <p>2 Q And in theory -- by "in theory," you mean you</p> <p>3 know an equation for permeability?</p> <p>4 A Yes. There are equations for permeability.</p> <p>5 Q Can you tell us which equation you used to</p> <p>6 calculate permeability?</p> <p>7 A I don't remember which one is in his program.</p> <p>8 Q Is the equation that he used to calculate</p> <p>9 permeability reflected in any part of TexCom Exhibit</p> <p>10 No. 91?</p> <p>11 A No, ma'am.</p> <p>12 Q Do you know an equation by which you would</p> <p>13 calculate permeability if you have an injection rate, a</p> <p>14 viscosity, a thickness of the formation and the fall-off</p> <p>15 pressure data such as you have in TexCom Exhibit No. 91?</p> <p>16 A Off the top of my head; no, ma'am, I don't know</p> <p>17 the equation.</p> <p>18 Q If I could perhaps reference you to Advances in</p> <p>19 Well Test Analysis, do you think there might be an</p> <p>20 equation in here that would help you?</p> <p>21 A There probably is an equation in there; yes,</p> <p>22 ma'am.</p> <p>23 MS. MENDOZA: Your Honor, may I approach?</p> <p>24 JUDGE WALSTON: Yes.</p> <p>25 Q (BY MS. MENDOZA) Mr. Casey, if you would, take</p>	264	<p>1 JUDGE WALSTON: Mr. Riley, if you want to</p> <p>2 go look --</p> <p>3 MR. RILEY: Is it okay if I wander over?</p> <p>4 JUDGE WALSTON: Yes.</p> <p>5 MR. RILEY: Yeah. I don't understand it.</p> <p>6 Q (BY MS. MENDOZA) Mr. Casey, Mr. Riley may not</p> <p>7 understand the equation, but do you understand the</p> <p>8 equation?</p> <p>9 A Yes, ma'am.</p> <p>10 Q And this equation -- I'm going to try to say</p> <p>11 this and maybe I'll miss some of the names of the</p> <p>12 variables, but as I see the equation, it says K equals</p> <p>13 162.6 times Q times B times mu divided by M times H. Is</p> <p>14 that correct?</p> <p>15 A Yes, ma'am.</p> <p>16 Q And K is the permeability. That's what we're</p> <p>17 trying to calculate?</p> <p>18 A Yes, ma'am.</p> <p>19 Q And Q would be the injection rate?</p> <p>20 A Correct.</p> <p>21 Q B is a formation volume factor of some sort?</p> <p>22 A Correct.</p> <p>23 Q Mu is viscosity?</p> <p>24 A Correct.</p> <p>25 Q H is the thickness of the formation?</p>

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265	<p>1 A Correct.</p> <p>2 Q And M is the slope that you would get from your</p> <p>3 fall-off test when you plot pressure over -- top</p> <p>4 pressure against basically a log of time. Is that</p> <p>5 correct?</p> <p>6 A I believe that's correct; yes, ma'am.</p> <p>7 Q In looking through the book, I saw another</p> <p>8 variable that was S, and it was for skin.</p> <p>9 I do not see any skin or skin factor in</p> <p>10 this particular equation for permeability. Do you see</p> <p>11 it in there?</p> <p>12 A No, ma'am.</p> <p>13 Q So using this equation for permeability, no</p> <p>14 matter what my skin is, I am going to get the same</p> <p>15 permeability. Is that correct?</p> <p>16 A You would get a permeability, yes.</p> <p>17 Q So if I varied skin using this equation, I'm</p> <p>18 going to vary my permeability?</p> <p>19 A No, ma'am.</p> <p>20 Q Thank you. We've all talked a lot about</p> <p>21 permeability in this case. I want to make sure we're on</p> <p>22 the same page.</p> <p>23 Permeability is, in layman's terms,</p> <p>24 essentially a measurement of how easy it is for the</p> <p>25 fluid to flow through the rock. Is that correct?</p>	267
266	<p>1 A Yes, horizontal permeability is the ability of</p> <p>2 it to flow horizontally through the rock.</p> <p>3 Q And you've used that permeability in models or</p> <p>4 equations where you have calculated pressure. Is that</p> <p>5 correct?</p> <p>6 A Calculated what pressure?</p> <p>7 Q I'm sorry. When you -- do you use permeability</p> <p>8 in your normal work in different models to calculate</p> <p>9 pressures within an injection interval perhaps?</p> <p>10 A Yes, ma'am.</p> <p>11 Q And so when you change permeability, it changes</p> <p>12 pressure -- is that correct -- all other things being</p> <p>13 equal? Is that correct?</p> <p>14 A Yes, ma'am.</p> <p>15 Q In this 2009 fall-off test, what skin did the</p> <p>16 test show?</p> <p>17 A Skin factor was 22.7.</p> <p>18 Q And in the 1999 fall-off test, do you remember</p> <p>19 what skin factor that test showed?</p> <p>20 A No, ma'am, I don't.</p> <p>21 Q Let me show you TexCom Exhibit 11, Page 165.</p> <p>22 Did the 1999 fall-off test show a skin of 5.92?</p> <p>23 A Yes, it did.</p> <p>24 Q Did you conduct your model that you've</p> <p>25 submitted with your remand testimony using a skin of</p>	268

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269	<p>1 modeling that you have submitted as TexCom Exhibit</p> <p>2 No. 85 as a skin factor?</p> <p>3 MR. RILEY: Objection; asked and answered.</p> <p>4 JUDGE WALSTON: He hasn't specifically</p> <p>5 answered it, but this is getting repetitive. He's</p> <p>6 effectively answered the question. He said it was zero,</p> <p>7 which is -- I think common sense tells us that's not a</p> <p>8 positive number. It's kind of getting argumentative.</p> <p>9 But can you answer the question, Mr.</p> <p>10 Casey, specifically?</p> <p>11 A Restate the question, please.</p> <p>12 Q (BY MS. MENDOZA) In the modeling that you have</p> <p>13 submitted as TexCom Exhibit No. 85, did you assume a</p> <p>14 minor positive number as the skin factor?</p> <p>15 A No.</p> <p>16 Q Thank you. The modeling that you have done in</p> <p>17 TexCom Exhibit No. 85 is a model using one well -- is</p> <p>18 that correct -- one injection well?</p> <p>19 A Yes, ma'am.</p> <p>20 Q Does the model that you've submitted as part of</p> <p>21 TexCom 85 show any producing wells in the model?</p> <p>22 A No. We've modeled the lower Cockfield, and</p> <p>23 there's no production in the lower Cockfield.</p> <p>24 Q Mr. Casey, my question is very simple.</p> <p>25 Did the model that you have submitted as</p>	271	<p>1 Q Now I going to ask you about the other modeling</p> <p>2 that you have done in this case that you submitted in</p> <p>3 the last hearing. Do you remember that modeling?</p> <p>4 A Yes, ma'am.</p> <p>5 Q Did the modeling that you submitted in this</p> <p>6 case in the last hearing include in it any producing</p> <p>7 wells?</p> <p>8 A No, it did not.</p> <p>9 Q Did it include any injecting wells, other than</p> <p>10 WDW410?</p> <p>11 A No, ma'am.</p> <p>12 Q Did it include four wells, injecting?</p> <p>13 A No, it did not.</p> <p>14 Q Did the modeling that you have submitted in</p> <p>15 TexCom Exhibit 85 show a fault -- or account for a fault</p> <p>16 approximately 4,400 feet south of WDW410?</p> <p>17 A Yes, it did.</p> <p>18 Q I wanted to clear up some confusion that I had</p> <p>19 when I was going through the application.</p> <p>20 Did you at one point locate that fault</p> <p>21 700 feet south of WDW315?</p> <p>22 A I cannot remember, ma'am.</p> <p>23 Q Let me point you to TexCom Exhibit 6, Page 62.</p> <p>24 JUDGE WALSTON: Which page did you say?</p> <p>25 MS. MENDOZA: TexCom Exhibit 6, Page 62.</p>
270	<p>1 TexCom Exhibit No. 85 include any producing wells?</p> <p>2 A No, ma'am.</p> <p>3 Q Did the model that you submitted as TexCom</p> <p>4 Exhibit No. 85 show any injection wells, other than</p> <p>5 WDW410?</p> <p>6 A No, ma'am.</p> <p>7 Q Did any of the models that you submitted in</p> <p>8 your testimony in the first hearing on these permits</p> <p>9 include any producing wells?</p> <p>10 MR. RILEY: Objection; asked and answered.</p> <p>11 "Did the modeling you submitted" --</p> <p>12 JUDGE WALSTON: I think now she asked in</p> <p>13 the first hearing. Her question was slightly different.</p> <p>14 Q (BY MS. MENDOZA) Did you understand my</p> <p>15 question to be different than the last ones?</p> <p>16 A I'm not quite sure. Can you go back through</p> <p>17 them again?</p> <p>18 Q Yes, I can go back through it again.</p> <p>19 First -- the last couple of questions that</p> <p>20 you answered, I was asking you about TexCom Exhibit</p> <p>21 No. 85.</p> <p>22 A Yes.</p> <p>23 Q Did you understand that when I asked those</p> <p>24 questions?</p> <p>25 A Yes.</p>	272	<p>1 If I could hand this to the --</p> <p>2 Q (BY MS. MENDOZA) Mr. Casey, do you recognize</p> <p>3 TexCom Exhibit No. 6, Page 62?</p> <p>4 A Yes, ma'am.</p> <p>5 Q This is part of the application for these</p> <p>6 permits?</p> <p>7 A Yes. It's the unrevised copy.</p> <p>8 Q We'll go through each revision. I'm reading</p> <p>9 right before where it says "VAI, regional petroleum</p> <p>10 production." Do you see -- I'm two lines up from there.</p> <p>11 A Yes, ma'am.</p> <p>12 Q And it references 7 comma 00 feet south of</p> <p>13 WDW315. Is this the 4,400-foot south fault that we've</p> <p>14 all been talking about?</p> <p>15 A I believe it is, but it's -- this is just kind</p> <p>16 of regional geology in the area. It's not specific</p> <p>17 so --</p> <p>18 Q So do you believe that there is a fault</p> <p>19 700 feet south of WDW315?</p> <p>20 A No. I believe it's a typo and a zero was left</p> <p>21 off. That's why there's a comma after the seven. It</p> <p>22 should be 7,000.</p> <p>23 Q Mr. Casey, let me refer you to TexCom</p> <p>24 Exhibit 20, Page 69.</p> <p>25 JUDGE WALSTON: Did you say Page 69?</p>

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273	<p>1 MS. MENDOZA: Page 69.</p> <p>2 Q (BY MS. MENDOZA) Do you recognize this to be</p> <p>3 an amendment or an addition to your application?</p> <p>4 A Yes. It's still the same version of Section 5.</p> <p>5 It's not the revised copy that's in the application.</p> <p>6 Q Okay. Let me refer you then to Page 15 of</p> <p>7 Exhibit 23. And on Page 15 of Exhibit 23, is that fault</p> <p>8 now located 7,300 feet south?</p> <p>9 A Yes, ma'am.</p> <p>10 Q This discussion doesn't talk about the</p> <p>11 4,400-foot south fault. Is that correct?</p> <p>12 A This discussion is strictly a regional</p> <p>13 overview.</p> <p>14 Q Was this discussion prepared by you?</p> <p>15 A No, ma'am, it was not.</p> <p>16 Q And who was it prepared by?</p> <p>17 A Dr. Langhus.</p> <p>18 Q Mr. Casey, when you conducted your modeling</p> <p>19 that you submitted as part of your testimony in this</p> <p>20 remand, did you conduct it basically the same way that</p> <p>21 it was conducted in your prior testimony?</p> <p>22 A Basically; yes, ma'am.</p> <p>23 Q Did you use the same sources for data, except</p> <p>24 for changing to 80.9 and changing to a nontransmissive</p> <p>25 fault?</p>	275
274	<p>1 A Yes. All we were instructed to do was to</p> <p>2 change the permeability to 80.9 and treat the fault as</p> <p>3 nontransmissive.</p> <p>4 Q Were your input parameters for your reservoir</p> <p>5 model generated from geologic data?</p> <p>6 A Geologic data and the original well drilling</p> <p>7 report.</p> <p>8 Q In part from geologic data?</p> <p>9 A In part; yes, ma'am.</p> <p>10 Q And in part from drilling logs?</p> <p>11 A Yes, ma'am.</p> <p>12 Q And in part from wire line logging?</p> <p>13 A Yes, ma'am.</p> <p>14 Q And in part from standard correlations?</p> <p>15 A I believe so; yes, ma'am.</p> <p>16 Q And in part from structural maps?</p> <p>17 A I'm sure they're included; yes, ma'am.</p> <p>18 Q And in part from analysis of the injection</p> <p>19 fall-off testing?</p> <p>20 A Yes.</p> <p>21 Q As to the drilling logs, did you draw data from</p> <p>22 the WDW315 log?</p> <p>23 A I'm sure we did.</p> <p>24 Q Did you do the modeling analysis?</p> <p>25 A Dr. Mark Layne did the modeling of the --</p>	276
	<p>1 Q Did you provide the input parameters to</p> <p>2 Dr. Layne?</p> <p>3 A It was a combination of, you know, myself and</p> <p>4 Dr. Langhus and Dr. Mark Layne working together; yes,</p> <p>5 ma'am.</p> <p>6 Q Do you know what drilling logs they drew data</p> <p>7 from?</p> <p>8 A Offhand; no, ma'am. I mean, we had lots of</p> <p>9 data that we sorted through to build the model.</p> <p>10 Q So if I were to go to all the documents that</p> <p>11 have been produced to us in this case, I would find all</p> <p>12 the drilling logs from which you have drawn data?</p> <p>13 A I believe so; yes, ma'am. We've submitted</p> <p>14 everything we've had.</p> <p>15 Q And for the analysis of the injection fall-off</p> <p>16 testing that generated input parameters into your model,</p> <p>17 what input parameters came from the analysis of the</p> <p>18 injection fall-off testing?</p> <p>19 A Offhand I couldn't tell you what we took from</p> <p>20 it. It was part of the data that we reviewed to help us</p> <p>21 make our decisions on what to input in the model.</p> <p>22 Q So in your first modeling that you submitted,</p> <p>23 you did not use the injection fall-off testing for the</p> <p>24 permeability, did you?</p> <p>25 A No, ma'am.</p>	
	<p>1 Q You used the injection fall-off testing for</p> <p>2 some other input parameter?</p> <p>3 A It was part of the data we reviewed to build</p> <p>4 the model. As to if we took specific data from it, I</p> <p>5 could not tell you.</p> <p>6 Q So if you had put in your application that</p> <p>7 input parameters for the reservoir model were generated</p> <p>8 from, and then a list of things, including analysis of</p> <p>9 injection fall-off testing, you do not know what input</p> <p>10 parameter came from the analysis of injection fall-off</p> <p>11 testing. Is that your testimony?</p> <p>12 A Yes, ma'am. We took data from numerous sources</p> <p>13 and then made engineering choices on how to set up the</p> <p>14 model.</p> <p>15 Q And so you chose to use some things from the</p> <p>16 fall-off testing and you chose to not use some things</p> <p>17 from the fall-off testing. Is that correct?</p> <p>18 A It was part of the data that we reviewed.</p> <p>19 Q Earlier you referred to engineering choices,</p> <p>20 and I want to explore what choices you made when you</p> <p>21 were looking at the fall-off testing.</p> <p>22 What data did you choose to use from the</p> <p>23 fall-off testing?</p> <p>24 MR. RILEY: To be clear -- I'm sorry,</p> <p>25 Judge.</p>	

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277	<p>1 JUDGE WALSTON: I just want to ask some</p> <p>2 clarification to make sure I understand what you're</p> <p>3 asking.</p> <p>4 Are you talking about the original</p> <p>5 modeling from the prior hearing in the original fall-off</p> <p>6 tests? Is that what you're talking about?</p> <p>7 MS. MENDOZA: Yes, that is what I'm</p> <p>8 talking about.</p> <p>9 JUDGE WALSTON: I thought so, but I just</p> <p>10 wanted to make sure.</p> <p>11 MS. MENDOZA: Thank you.</p> <p>12 Q (BY MS. MENDOZA) In your original model, what</p> <p>13 data from the fall-off tests did you choose to use?</p> <p>14 A As I stated, we didn't specifically -- off the</p> <p>15 top of my head remember choosing a specific number from</p> <p>16 the fall-off test. It was part of the data we reviewed</p> <p>17 in generating our model.</p> <p>18 Q I'm very confident that you chose not to use</p> <p>19 the permeability from the fall-off test. Is that</p> <p>20 correct?</p> <p>21 A Correct. We did not use the permeability from</p> <p>22 the fall-off test.</p> <p>23 Q Did you use any other data from the fall-off</p> <p>24 test in your first model?</p> <p>25 A As I stated, it was part of what we reviewed.</p>	279	<p>1 which would give him some time to just take a careful</p> <p>2 look at it.</p> <p>3 JUDGE WALSTON: Okay. That will be fine.</p> <p>4 MR. RILEY: I don't think that's what</p> <p>5 we're waiting for but --</p> <p>6 JUDGE WALSTON: We'll take a 15-minute</p> <p>7 break. We'll resume at 10:25. We'll go off the record.</p> <p>8 (Recess: 10:06 a.m. to 10:25 a.m.)</p> <p>9 JUDGE WALSTON: We'll go back on the</p> <p>10 record. Ms. Mendoza, you can proceed.</p> <p>11 MS. MENDOZA: Yes. Thank you.</p> <p>12 Q (BY MS. MENDOZA) Mr. Casey, I think when we</p> <p>13 left there was a question pending. I asked you if this</p> <p>14 TexCom Exhibit 6, Page 206, and the data that follows</p> <p>15 it, is part of TexCom's application for its well.</p> <p>16 Is it part of TexCom's application?</p> <p>17 A Yes, ma'am.</p> <p>18 Q And do you recognize what it is?</p> <p>19 A It looks like the input file for the BOAST</p> <p>20 model.</p> <p>21 Q And this is the input file for the BOAST model</p> <p>22 that was submitted in the original hearing in this case.</p> <p>23 Is that correct?</p> <p>24 A In looking at it, it's an input file. I cannot</p> <p>25 say for sure it's the one -- because the -- it says one</p>
278	<p>1 If we took a specific number from that, I could not tell</p> <p>2 you, but it was part of the data that we reviewed to</p> <p>3 build the model.</p> <p>4 Q Let me see if I can locate what I think is the</p> <p>5 input file for your first model.</p> <p>6 MS. MENDOZA: Your Honor, if I can</p> <p>7 approach the witness?</p> <p>8 MR. RILEY: Do we have an idea of --</p> <p>9 MS. MENDOZA: It's TexCom Exhibit 6,</p> <p>10 Page 206.</p> <p>11 Q (BY MS. MENDOZA) Do you recognize that,</p> <p>12 Mr. Casey.</p> <p>13 A It's a BOAST data file; yes, ma'am.</p> <p>14 Q Is this the BOAST data file you used to</p> <p>15 generate your first model that you submitted in this</p> <p>16 case?</p> <p>17 A I don't believe so, but not knowing exactly</p> <p>18 where it came from --</p> <p>19 Q Mr. Casey, it is part of TexCom's exhibit,</p> <p>20 isn't it? It is part of TexCom's application. Is that</p> <p>21 correct?</p> <p>22 (Brief pause)</p> <p>23 MR. RILEY: Would this be a good time for</p> <p>24 a morning break?</p> <p>25 MS. MENDOZA: It might be a good time,</p>	280	<p>1 permeability on the input file, and the output file has</p> <p>2 a different permeability. So potentially the wrong</p> <p>3 input file got put in the application.</p> <p>4 Q I've been struggling with that. Do you perhaps</p> <p>5 know where the correct input file is?</p> <p>6 A I would imagine it's in our original submittals</p> <p>7 for the first hearing. They took all the information</p> <p>8 that we had. So I would assume that it's in that</p> <p>9 information that was submitted with the first hearing.</p> <p>10 Q Do you think it's an exhibit that was entered</p> <p>11 into the record in the first hearing?</p> <p>12 A I honestly don't know if it was entered as an</p> <p>13 exhibit or not.</p> <p>14 Q So if I was looking for the input data that you</p> <p>15 used in the model that you submitted as part of your</p> <p>16 testimony in the first hearing, I don't have it, if all</p> <p>17 I have is this input file. Is that correct?</p> <p>18 A That would be my assumption, if this is the</p> <p>19 only input file that you have.</p> <p>20 Q Do you think if you took a little bit of time</p> <p>21 you could find the input file?</p> <p>22 A I'm sure we could locate it somewhere.</p> <p>23 MS. MENDOZA: Your Honor, I would ask that</p> <p>24 TexCom be asked to take a look for the input file. I</p> <p>25 will, at the same time, sit our experts down with all</p>

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281	<p>1 the data that has been produced and ask them to do the</p> <p>2 exact same thing and try to find that input file.</p> <p>3 JUDGE WALSTON: So I'm not sure I</p> <p>4 understand what you're asking. You're looking through</p> <p>5 all the exhibits that were in the first case, or</p> <p>6 what are you asking?</p> <p>7 MS. MENDOZA: I'm asking TexCom to confirm</p> <p>8 that they have the input file for the model that was</p> <p>9 entered in the first hearing and that was put as a part</p> <p>10 of the application, because if I'm understanding</p> <p>11 Mr. Casey's testimony correctly, he does not believe</p> <p>12 that the input file that is found at TexCom Exhibit 6,</p> <p>13 Page 206, actually corresponds to the output file.</p> <p>14 And I'm trying to find the input file that</p> <p>15 goes with the output file that generated the model that</p> <p>16 is part of Mr. Casey's testimony.</p> <p>17 JUDGE WALSTON: Mr. Riley, do you have a</p> <p>18 response?</p> <p>19 MR. RILEY: I do. This is similar to</p> <p>20 yesterday's events where Ms. Mendoza questioned whether</p> <p>21 we had provided her with certain data. Really, in 30</p> <p>22 minutes' time, we were able to find the data, that it</p> <p>23 had been provided in discovery in due course. It seems</p> <p>24 inappropriate to conduct discovery in the middle of a</p> <p>25 hearing. So my suggestion is we proceed.</p>	283	<p>1 of data tonight and I -- it didn't seem like it took</p> <p>2 them very long yesterday to lay their hands directly on</p> <p>3 it given that this witness had generated it, but if they</p> <p>4 don't want to look for the input file from their first</p> <p>5 modeling run, I'm puzzled by that.</p> <p>6 JUDGE WALSTON: What is your purpose in</p> <p>7 seeking the input file?</p> <p>8 MS. MENDOZA: My purpose in seeking this</p> <p>9 is that the witness has talked about what changes he</p> <p>10 made between the testimony that -- the modeling</p> <p>11 testimony that he has offered as part of this remand</p> <p>12 hearing and the modeling that he did in the first</p> <p>13 hearing.</p> <p>14 And we want to see the inputs that he used</p> <p>15 in the first hearing so that we can talk to him about</p> <p>16 the changes that he has made between the last hearing</p> <p>17 and this current testimony and determine why he made</p> <p>18 those changes and what it is that is the basis of those</p> <p>19 changes.</p> <p>20 JUDGE WALSTON: Before maybe we go on a</p> <p>21 goose chase, I'm not sure we got an answer from him of</p> <p>22 whether he made any changes, other than what was</p> <p>23 directed by the remand order. Maybe we need to find out</p> <p>24 if there were any changes. And maybe you've asked that</p> <p>25 and I just don't remember it.</p>
282	<p>1 If Ms. Mendoza wants to make some point at</p> <p>2 some time about the input file that's in the</p> <p>3 application, I don't think there's any question --</p> <p>4 Ms. Mendoza said this earlier. There's no question that</p> <p>5 TexCom used 500 millidarcies as the permeability in the</p> <p>6 original modeling. That output file is in the</p> <p>7 application. So I'm really not sure what question we're</p> <p>8 trying to answer here, but I don't think it's</p> <p>9 appropriate to send us on another chase for data when I</p> <p>10 believe it's been provided in production.</p> <p>11 MS. MENDOZA: My confusion is that I'm</p> <p>12 looking at what was submitted as part of the -- as part</p> <p>13 of the application, and I'm looking at the input file.</p> <p>14 And I've asked the witness if this was the input file,</p> <p>15 and I believe he has said it is not. And I am trying to</p> <p>16 look at what his input was this past time -- you know,</p> <p>17 in his current testimony and see where he has changed</p> <p>18 from the last one.</p> <p>19 And I, too, was -- this looked odd when I</p> <p>20 looked at it. So I'm trying to figure out where the</p> <p>21 input file is. If it's been produced, then -- I'm not</p> <p>22 suggesting we stop testimony and take a break or</p> <p>23 anything like that. I'm just suggesting that perhaps</p> <p>24 the witness knows where the input file is, but if it has</p> <p>25 been produced to us, then we will look through the boxes</p>	284	<p>1 At this time, I'll take your request under</p> <p>2 advisement.</p> <p>3 MS. MENDOZA: Okay. Thank you.</p> <p>4 Q (BY MS. MENDOZA) I will ask that. Did you</p> <p>5 make any other changes to your model, other than the two</p> <p>6 changes that were directed by the remand order?</p> <p>7 A No. The only changes we made was we changed</p> <p>8 permeability to 80.9 and treated the fault as</p> <p>9 nontransmissive.</p> <p>10 And I will point out that at the top of</p> <p>11 the output file, it has the parameters listed that were</p> <p>12 on the input file.</p> <p>13 Q Yes. Okay. So the output file does, then,</p> <p>14 give me the input. And if I needed that information, I</p> <p>15 could go to the output file and get it just as easily as</p> <p>16 from the input file?</p> <p>17 A Yes. It looks to be the same information, just</p> <p>18 with the one change.</p> <p>19 Q Okay. So that answers my question. I don't</p> <p>20 think we need to go and look for it because I can just</p> <p>21 look at the output file that was there.</p> <p>22 If you could, take a look at the same</p> <p>23 volume in front of you, TexCom Exhibit 6, Page 127. Do</p> <p>24 you have TexCom Exhibit 6, Page 127, in front of you?</p> <p>25 A Yes, I do.</p>

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<p style="text-align: right;">285</p> <p>1 Q Do you recognize that?</p> <p>2 A Yes, ma'am.</p> <p>3 Q At the bottom of Page -- TexCom Exhibit 6,</p> <p>4 Page 127, in Section VII.C.1, the second sentence, it</p> <p>5 says, "The model is configured for closed outer</p> <p>6 boundaries." Is that correct?</p> <p>7 A That's what it says; yes, ma'am.</p> <p>8 Q Is that your understanding of how you modeled</p> <p>9 the reservoir in your original testimony?</p> <p>10 A Well, this is the unrevised version I'm looking</p> <p>11 at.</p> <p>12 Q Let me pull up the other versions because this</p> <p>13 is an important point, and I want to make sure that we</p> <p>14 get the correct one.</p> <p>15 MR. RILEY: Objection to the editorial</p> <p>16 comments. What's important, what's not important is for</p> <p>17 you.</p> <p>18 JUDGE WALSTON: I'll overrule your</p> <p>19 objection. I guess it's important to the party.</p> <p>20 MS. MENDOZA: Your Honor, may I approach</p> <p>21 the witness?</p> <p>22 JUDGE WALSTON: Yes.</p> <p>23 Q (BY MS. MENDOZA) How many revisions did you</p> <p>24 make to the application?</p> <p>25 A To this section, it's two or three revisions.</p>	<p style="text-align: right;">287</p> <p>1 file in order to look at it.</p> <p>2 Q This is the input file that actually isn't in</p> <p>3 the application?</p> <p>4 A Apparently not; yes, ma'am.</p> <p>5 Q So you can't tell me by looking at the output</p> <p>6 file whether you used a closed outer boundary?</p> <p>7 A Not -- no, ma'am; I cannot.</p> <p>8 Q You adopted -- you prepared TexCom Exhibit 6.</p> <p>9 Is that correct?</p> <p>10 It is part of the application, isn't it?</p> <p>11 A Yes, it is.</p> <p>12 MR. RILEY: Can we get an answer to one</p> <p>13 question at a time, please.</p> <p>14 MS. MENDOZA: I'm sorry.</p> <p>15 Q (BY MS. MENDOZA) Did you prepare TexCom</p> <p>16 Exhibit 6?</p> <p>17 A Yes, I did.</p> <p>18 Q Is it part of the application?</p> <p>19 A Yes, it is.</p> <p>20 Q Did you adopt it as part of your testimony in</p> <p>21 the last hearing?</p> <p>22 A Yes, I did.</p> <p>23 Q Did you prepare each of the updates to the</p> <p>24 application?</p> <p>25 A Yes, ma'am.</p>
<p style="text-align: right;">286</p> <p>1 I don't remember off the top of my head.</p> <p>2 Q I want to -- I did not run through these</p> <p>3 changes. So I have TexCom Exhibit 20 and TexCom Exhibit</p> <p>4 23. Could you look and see if either one of those</p> <p>5 exhibits revised this particular section that we're</p> <p>6 talking about?</p> <p>7 I've also handed you Exhibits 21, 24, 19</p> <p>8 and 22. So I think once -- I've now handed you</p> <p>9 Exhibits 19 through 24, which I understand to be all of</p> <p>10 the updates to the UIC application.</p> <p>11 So I'm just wanting to see if you have</p> <p>12 updated the statement that the first model was conducted</p> <p>13 using a closed outer boundary.</p> <p>14 A Okay. Now, what was your question again?</p> <p>15 Sorry.</p> <p>16 Q Okay. Did your first model -- was your prior</p> <p>17 testimony -- your prior testimony that had a model in</p> <p>18 it, was that model conducted using -- or configured with</p> <p>19 a closed outer boundary?</p> <p>20 A I would really have to look. I mean, I know</p> <p>21 the text says that we configured for a closed outer</p> <p>22 boundary. I would need to go back and make sure this</p> <p>23 didn't get left out of any updates when we submitted the</p> <p>24 final model in the original application. I would have</p> <p>25 to look at the model. I would have to find the input</p>	<p style="text-align: right;">288</p> <p>1 Q Do you believe that there are updates that I</p> <p>2 have not provided to you here?</p> <p>3 A As far as I can tell, you provided the updates</p> <p>4 we've done.</p> <p>5 Q Did any of those updates change the sentence</p> <p>6 that is found in Section VII.C.1 that says the model is</p> <p>7 configured for closed outer boundaries?</p> <p>8 A In what I've seen; no, ma'am. That sentence</p> <p>9 has not changed.</p> <p>10 Q Do you now believe that sentence to be</p> <p>11 incorrect?</p> <p>12 A I believe our model is configured with an open</p> <p>13 boundary at the edge.</p> <p>14 Q You now believe that all the testimony that you</p> <p>15 have given in this case about the closed outer boundary</p> <p>16 of your first model is incorrect?</p> <p>17 MR. RILEY: Objection. What testimony</p> <p>18 about closed outer boundaries of the first model has</p> <p>19 there been?</p> <p>20 MS. MENDOZA: He just indicated that he</p> <p>21 had adopted TexCom Exhibit 6 as his testimony, and that</p> <p>22 testimony would then be the model is configured for</p> <p>23 closed outer boundaries.</p> <p>24 JUDGE WALSTON: With that understanding,</p> <p>25 I'll overrule the objection.</p>

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289	<p>1 Q (BY MS. MENDOZA) Are you retracting your prior 2 testimony today?</p> <p>3 MR. RILEY: Objection. What testimony 4 specifically is counsel asking the witness to retract?</p> <p>5 Q (BY MS. MENDOZA) Mr. Casey, are you retracting 6 your prior testimony as reflected in Section VII.C.1 of 7 Exhibit 6 that the model is configured for closed outer 8 boundaries?</p> <p>9 MR. RILEY: Objection. What he testified 10 to was that this is the application that was submitted 11 to the agency. Counsel would like the witness to state 12 now that that line in the application is incorrect, what 13 she's already stated. He's not testified, to the best 14 of my recollection, any time specifically about that 15 line in the application. So when she asks about 16 testimony, it's an unfair question.</p> <p>17 JUDGE WALSTON: I'll sustain the objection 18 to the form of the question because your question 19 suggests he gave oral testimony stating that fact, 20 whereas I think his actual testimony was just that he 21 approved the application -- or adopted the application.</p> <p>22 So if you want to phrase it in the context 23 of what the application says, I'll allow that question.</p> <p>24 MS. MENDOZA: Thank you, Your Honor.</p> <p>25 Q (BY MS. MENDOZA) Mr. Casey, are you now</p>	291	<p>1 Q Mr. Casey, let me point you to TexCom 2 Exhibit 6, Page 213.</p> <p>3 A Okay.</p> <p>4 Q I'm looking halfway down the page on TexCom 5 Exhibit 6, Page 213, and there's a line of asterisks 6 with the words "porosity node modifications." Do you 7 see that?</p> <p>8 A Yes, ma'am.</p> <p>9 Q Do you know what that means?</p> <p>10 A Not specifically.</p> <p>11 Q Would this be one of the inputs that you 12 directed your staff to use in coming up with this model?</p> <p>13 A As I said, Dr. Mark Layne is our modeling 14 expert. He built the model, and as far as what that 15 line means, I could not tell you.</p> <p>16 Q And you need to look at the input file for 17 this. Correct?</p> <p>18 A I could look at it. Like I said, Dr. Mark 19 Layne built the model, and he would be the one that 20 could specifically help me read how the file was put 21 together to determine how the boundaries were set.</p> <p>22 Q So you have no idea, as we sit here today, how 23 the boundaries were set?</p> <p>24 A I do not remember exactly how we set the 25 boundaries on the first model.</p>
290	<p>1 stating that if the application said that the model -- 2 the model that you first submitted to the agency was 3 configured for closed outer boundaries, that your -- 4 that the application was incorrect?</p> <p>5 A I would need to look at the input file to 6 really verify -- to make sure we did use open outer 7 boundaries.</p> <p>8 Q Did I misunderstand your prior testimony where 9 you said I could look at the output file and know what 10 was used in the input file?</p> <p>11 A The parameters used; yes, ma'am.</p> <p>12 Q Do you have that output file here with you in 13 Exhibit 6 today?</p> <p>14 A It does not -- the output file doesn't -- it 15 doesn't state the complete model configuration in the 16 output file. It has the input parameters that were put 17 into the model.</p> <p>18 Q So the output file tells me nothing about the 19 boundary conditions that you used in the model that you 20 submitted to the TCEQ with your application. Is that 21 correct?</p> <p>22 A The output file -- there is probably a way to 23 figure it out from the output file, but I am not the 24 expert in BOAST. That would be Dr. Mark Layne who did 25 our modeling.</p>	292	<p>1 Q But you believe that it was not a closed outer 2 boundary?</p> <p>3 A The best of my recollection is we did an open 4 boundary at the edge, but without talking to Dr. Mark, I 5 could not verify that fact.</p> <p>6 Q Could you verify that fact if you had the input 7 file?</p> <p>8 A Possibly, but, you know, I'm not the modeling 9 expert who works with BOAST.</p> <p>10 Q This is completely outside your area of 11 expertise?</p> <p>12 A No. Modeling is within my area of expertise. 13 I have a person on my staff who specializes in modeling 14 and wrote his thesis on reservoir modeling.</p> <p>15 Q You didn't write a thesis on reservoir 16 modeling, did you?</p> <p>17 A No, ma'am; I did not.</p> <p>18 Q Is your seal affixed to the application?</p> <p>19 A Yes, it is.</p> <p>20 Q Does it include this model that we've been 21 talking about?</p> <p>22 A Yes, it does.</p> <p>23 Q And you supervised that work?</p> <p>24 A Yes, I did.</p> <p>25 Q You reviewed it?</p>

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293	<p>1 A Yes, I did.</p> <p>2 Q You made sure it was correct?</p> <p>3 A Yes, I did.</p> <p>4 Q You looked at the text in Section VII.C.1 of</p> <p>5 the application. Is that correct?</p> <p>6 A Yes, I did.</p> <p>7 Q You made sure that was correct?</p> <p>8 A Yes, ma'am.</p> <p>9 Q How did you make sure that closed outer</p> <p>10 boundaries was actually your model condition?</p> <p>11 A At the time, it's possible that I missed that</p> <p>12 one line. I have six binders of information in the</p> <p>13 first application that I reviewed.</p> <p>14 Q Have you gone back through that to see what</p> <p>15 else you may have missed?</p> <p>16 A No, ma'am.</p> <p>17 Q Can you look at the various modifications to</p> <p>18 the application that you made after TexCom Exhibit 6 was</p> <p>19 submitted to the agency and tell me, did you make --</p> <p>20 were there any of those that included a new Section</p> <p>21 VII.C.1?</p> <p>22 A Yes, there were new Section VIIs submitted.</p> <p>23 Q How many new Section VII.C.1s, were submitted</p> <p>24 to the agency?</p> <p>25 (Brief pause)</p>	295	<p>1 one. If it continues to be a problem we can -- but does</p> <p>2 the document she just gave you complete the exhibit?</p> <p>3 A Yes. That was the missing page. I just wasn't</p> <p>4 sure if they were maps or pages or --</p> <p>5 MR. RILEY: Thank you.</p> <p>6 A There shows to be, of that particular page, at</p> <p>7 least two revisions.</p> <p>8 Q (BY MS. MENDOZA) Did each one of those</p> <p>9 revisions say that the model is configured for closed</p> <p>10 outer boundaries?</p> <p>11 A Yes, it did.</p> <p>12 Q If the agency believed that the model was</p> <p>13 configured for closed outer boundaries, were they</p> <p>14 justified in that belief?</p> <p>15 A Can you restate the question?</p> <p>16 Q If the agency believed that the model was</p> <p>17 configured for closed outer boundaries, were they</p> <p>18 justified in having that belief?</p> <p>19 A Yes.</p> <p>20 Q If you could, now, turn to your testimony which</p> <p>21 you've just entered, which was Exhibit 85 -- and I'll</p> <p>22 take some of this out of your way. I'll just push it</p> <p>23 over to the side for you.</p> <p>24 If you look at Page 7 of TexCom Exhibit</p> <p>25 85 -- can you find that?</p>
294	<p>1 A There seems to be some pages missing from</p> <p>2 TexCom Exhibit 23.</p> <p>3 Q I'm sorry. Let me see if I can find a better</p> <p>4 copy of it.</p> <p>5 MR. RILEY: Just to be clear, that's, I</p> <p>6 think, counsel's copy that the witness has been working</p> <p>7 with. I don't know if that's true in the record copy.</p> <p>8 MS. MENDOZA: Yes, it may very well be our</p> <p>9 error in copying or in providing an exhibit, so let me</p> <p>10 pull that again.</p> <p>11 Q (BY MS. MENDOZA) I think maybe if I gave you</p> <p>12 Pages 52 and 53, would that answer -- would that make it</p> <p>13 a complete copy or are there other pages missing? I</p> <p>14 apologize. I may have left out the two maps --</p> <p>15 oversized maps.</p> <p>16 MR. RILEY: Your Honor, it really would</p> <p>17 help, I think, if we just worked with the record copy as</p> <p>18 opposed to copies counsel is providing.</p> <p>19 MS. MENDOZA: I'm sorry.</p> <p>20 MR. RILEY: And I'm not suggesting any</p> <p>21 evil intent. It's just the record copy should be</p> <p>22 complete, and it would be helpful to work with the</p> <p>23 record copy, I think, rather than use counsel's copy.</p> <p>24 JUDGE WALSTON: We don't have the record</p> <p>25 copies from the prior hearing here, at least on this</p>	296	<p>1 A Yes, ma'am.</p> <p>2 Q And at the bottom of there, there is a section</p> <p>3 that is entitled "Reservoir Model Parameters/Model</p> <p>4 Construction." Do you see that?</p> <p>5 A Yes, ma'am.</p> <p>6 Q And do you see the second sentence?</p> <p>7 A Yes.</p> <p>8 Q And that sentence reads, "The model is</p> <p>9 configured for infinite-acting outer boundaries based on</p> <p>10 the large areal extent of the Cockfield formation." Is</p> <p>11 that correct?</p> <p>12 A That's correct.</p> <p>13 Q Is an infinite-acting outer boundary the same</p> <p>14 as a closed outer boundary?</p> <p>15 A No, ma'am.</p> <p>16 Q If you were actually accurate to the agency</p> <p>17 when you told them that your first model was used to do</p> <p>18 closed outer boundaries and your second model now uses</p> <p>19 an infinite-acting outer boundary, then that would be</p> <p>20 another change that you made in your model, other than</p> <p>21 changing the permeability and the fault transmissivity.</p> <p>22 Is that correct?</p> <p>23 A If that's how we configured the first model;</p> <p>24 yes, ma'am.</p> <p>25 Q And if that is how you configured the first</p>

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297	<p>1 model, then your testimony earlier was incorrect when</p> <p>2 you said you only made two changes to your model. Is</p> <p>3 that -- that testimony would have been incorrect if you</p> <p>4 were right on the closed outer boundary?</p> <p>5 A Yes, ma'am.</p> <p>6 Q Are you certain that you used an</p> <p>7 infinite-acting outer boundary in the model that you've</p> <p>8 submitted in your testimony today?</p> <p>9 A I believe so; yes, ma'am.</p> <p>10 Q How would you go about verifying that?</p> <p>11 A I believe we can look at the input or output</p> <p>12 files, but I would like to consult with my modeler who</p> <p>13 did the work for me.</p> <p>14 Q You didn't verify that before you entered your</p> <p>15 testimony today?</p> <p>16 A It was part of what we did -- what our</p> <p>17 instructions were, but if there was a difference between</p> <p>18 the first modeling and the second modeling, then I would</p> <p>19 have to check with him to make sure that we -- you know,</p> <p>20 exactly how we did it at this point.</p> <p>21 Q You just referenced "what our instructions</p> <p>22 were." Who gave you those instructions?</p> <p>23 A They came from the SOAH Judges.</p> <p>24 Q And did any of those instructions mention in</p> <p>25 any way using an infinite-acting outer boundary?</p>	299	<p>1 Q Did you look at the input file for the model</p> <p>2 that you submitted to the Judges today?</p> <p>3 A At one point in time, yes; I did look at it.</p> <p>4 Q Do you know what you used as the boundary</p> <p>5 condition in that model?</p> <p>6 A I believe it is an infinite-acting outer</p> <p>7 boundary.</p> <p>8 Q And how did you simulate in your model an</p> <p>9 infinite-acting outer boundary?</p> <p>10 A Based on what I believe Dr. Layne told me, we</p> <p>11 used large porosity again.</p> <p>12 Q Did you use a 340 percent porosity as the outer</p> <p>13 boundary?</p> <p>14 A That sounds about right.</p> <p>15 Q Yesterday when we adjourned, I believe we were</p> <p>16 looking at TexCom Exhibit 6, Page 239. By any chance,</p> <p>17 do you have that in front of you or do I need to dig</p> <p>18 that out of the stack?</p> <p>19 A I think it's right here.</p> <p>20 Q Do you recognize what starts in TexCom</p> <p>21 Exhibit 6, Page 239?</p> <p>22 A Yes, ma'am.</p> <p>23 Q And is that more or less what I would call an</p> <p>24 instruction manual for the BOAST model?</p> <p>25 A Yes, ma'am.</p>
298	<p>1 A I don't remember exactly what the instructions</p> <p>2 were. I know what the intent was, but as to what the</p> <p>3 actual words are, you know, I don't know exactly what</p> <p>4 they said.</p> <p>5 Q Are those instructions written down anywhere?</p> <p>6 A I suppose they are; yes, ma'am.</p> <p>7 Q Did you look at something to figure out what</p> <p>8 your instructions were?</p> <p>9 A We discussed with the lawyers as to what we</p> <p>10 needed to do, and we had made the changes.</p> <p>11 Q That wasn't my question.</p> <p>12 My question was did you look at something</p> <p>13 to determine what your instructions were?</p> <p>14 A Yes. We got instructions from the -- I forget</p> <p>15 what they call it, but what we were instructed to do by</p> <p>16 the hearing Judges.</p> <p>17 Q So it was a piece of paper?</p> <p>18 A Yes, ma'am. I don't remember what term you use</p> <p>19 but --</p> <p>20 Q You believe that that piece of paper instructed</p> <p>21 you to change your model to an infinite-acting outer</p> <p>22 boundary?</p> <p>23 A As I said, the instructions were to change it</p> <p>24 80.9 millidarcies and treat the fault as</p> <p>25 nontransmissive.</p>	300	<p>1 Q Can you look at Page 266 of TexCom Exhibit 6?</p> <p>2 A Yes, ma'am.</p> <p>3 Q Are you familiar with the information that</p> <p>4 starts on Page 266?</p> <p>5 A It's a discussion of an aquifer model.</p> <p>6 Q Did you use any of the aquifer models in the</p> <p>7 discussion that starts on Page 266 as the boundary</p> <p>8 condition in your current model that you're testifying</p> <p>9 about?</p> <p>10 A I don't know exactly how he modeled the outer</p> <p>11 edge.</p> <p>12 Q You are unaware of the boundary condition that</p> <p>13 you are submitting here as part of your testimony here</p> <p>14 today?</p> <p>15 A No. That's not what I said. I said I'm not</p> <p>16 aware of exactly how he modeled the outer condition.</p> <p>17 Q So did he use what they reference here as a pot</p> <p>18 aquifer?</p> <p>19 A I don't know, ma'am.</p> <p>20 Q Did he use a steady-state aquifer?</p> <p>21 A As I stated, I don't know which method he used</p> <p>22 for the outer boundary.</p> <p>23 Q Are you aware that there's been various</p> <p>24 testimony in the hearing about something called shale</p> <p>25 smearing?</p>

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301	<p>1 A Yes, ma'am.</p> <p>2 Q Do you have a general understanding of what</p> <p>3 shale smearing is?</p> <p>4 A Yes, ma'am.</p> <p>5 Q What is the net amount of shale in the lower</p> <p>6 Cockfield?</p> <p>7 A That net number? I couldn't tell you, ma'am.</p> <p>8 Q Do you know what the net amount of sand is in</p> <p>9 the lower Cockfield?</p> <p>10 A I believe it's in our application somewhere,</p> <p>11 but off the top of my head, I couldn't tell you.</p> <p>12 Q Yesterday when you had to -- when you left and</p> <p>13 consulted with somebody about the rates of investigation</p> <p>14 formula, who did you speak with?</p> <p>15 A Dr. Mark Layne.</p> <p>16 Q Did Mark Layne originally perform that</p> <p>17 calculation for you?</p> <p>18 A Yes, ma'am.</p> <p>19 Q How many fall-off tests do you believe that you</p> <p>20 would need to run to come up with an accurate or</p> <p>21 reliable permeability number for the lower Cockfield?</p> <p>22 A I couldn't tell you, ma'am. Permeability is an</p> <p>23 estimated value.</p> <p>24 Q Do you have a reliable permeability number for</p> <p>25 the lower Cockfield?</p>	303	<p>1 Q Is that because the rock in the formation has</p> <p>2 changed?</p> <p>3 A It's the --</p> <p>4 Q I'm sorry. Is that because the rock in the</p> <p>5 formation has changed?</p> <p>6 A Potentially; yes, ma'am.</p> <p>7 MS. MENDOZA: If I can just have a moment,</p> <p>8 I'll see if I've got anything else.</p> <p>9 (Brief pause)</p> <p>10 Q (BY MS. MENDOZA) On WDW410, where is the</p> <p>11 packer set?</p> <p>12 A I would have to look that up on the wellbore</p> <p>13 log.</p> <p>14 Q Does 5,108 feet sound about right?</p> <p>15 MR. RILEY: Objection. I think that it's</p> <p>16 appropriate for the witness, since he said he'd need to</p> <p>17 look at reference material, to -- either counsel calls</p> <p>18 attention to a document, rather than asking, "Does this</p> <p>19 sound about right?" I don't think that leads to much</p> <p>20 useful testimony in the case.</p> <p>21 JUDGE WALSTON: Well, he can say if that</p> <p>22 refreshes his memory or not, and if it doesn't and you</p> <p>23 need to look at something, let us know.</p> <p>24 A As I said, you know, I need to look at the</p> <p>25 wellbore log.</p>
302	<p>1 A We have a fall-off test that says 190.6. We</p> <p>2 have core data that shows higher than 500.</p> <p>3 Q I think my question was do you have a reliable</p> <p>4 number for the permeability in the lower Cockfield?</p> <p>5 Do you have a reliable number?</p> <p>6 A I believe both those are reliable estimates of</p> <p>7 permeability in the lower Cockfield.</p> <p>8 Q Do you believe 80.9 is a reliable number?</p> <p>9 A It is an estimation; yes, ma'am.</p> <p>10 Q My question is do you believe that 80.9 is a</p> <p>11 reliable number for the permeability in the lower</p> <p>12 Cockfield?</p> <p>13 A At that point in time; yes, ma'am. It is the</p> <p>14 number that was generated by fall-off tests.</p> <p>15 Q And you testified yesterday that permeability</p> <p>16 is a function of time. Correct?</p> <p>17 A I don't believe I said that; no, ma'am.</p> <p>18 Q You testified -- was your testimony, then, that</p> <p>19 you got different permeabilities at different times?</p> <p>20 A Yes. I've seen that in a number of wells.</p> <p>21 Q So I test a well today and I get one</p> <p>22 permeability and I test a well tomorrow and I get -- I</p> <p>23 test that same well two years from now, and I get a</p> <p>24 different permeability?</p> <p>25 A That is a possibility; yes, ma'am.</p>	304	<p>1 Q (BY MS. MENDOZA) Mr. Casey, let me see if</p> <p>2 maybe we can just go a little bit quicker there because</p> <p>3 I'm not sure that I'm positive where I can lay my hands</p> <p>4 on a wellbore drawing at the moment.</p> <p>5 Let me show you what is TexCom Exhibit 49.</p> <p>6 I'm going to reference you to Page 20 of that. I</p> <p>7 believe that this is your prefiled testimony in the</p> <p>8 first hearing in this case. Is that correct?</p> <p>9 A Yes, ma'am.</p> <p>10 Q Can you look at Page 20?</p> <p>11 A Okay.</p> <p>12 Q And will you look at page -- Lines 13 through</p> <p>13 14?</p> <p>14 A Okay.</p> <p>15 Q Does that say, "Packer set at 5,108 feet in</p> <p>16 Wells WDW410 or WDW315"?</p> <p>17 A Yes, ma'am.</p> <p>18 Q And was that testimony correct when you gave</p> <p>19 it?</p> <p>20 A I believe so; yes, ma'am.</p> <p>21 Q And do you believe today that the packer in</p> <p>22 Well WDW410 is set at 5,108 feet?</p> <p>23 A I know I haven't moved it, so I assume it's in</p> <p>24 the same place it was when the well was constructed.</p> <p>25 Q I would assume the same thing.</p>

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305	<p>1 MR. RILEY: Objection. Was that a</p> <p>2 question?</p> <p>3 MS. MENDOZA: No. I will withdraw the</p> <p>4 comment.</p> <p>5 Q (BY MS. MENDOZA) If you could, take a look at</p> <p>6 Page 23 in your testimony.</p> <p>7 JUDGE WALSTON: His previous testimony</p> <p>8 or --</p> <p>9 MS. MENDOZA: I'm sorry.</p> <p>10 Q (BY MS. MENDOZA) Page 23 in Exhibit 49, your</p> <p>11 previous testimony, Lines 26 through 27, you're</p> <p>12 discussing that the packer should be set right above the</p> <p>13 injection interval. Is that correct?</p> <p>14 A That's correct.</p> <p>15 Q What is the top of your injection interval in</p> <p>16 Well WDW410?</p> <p>17 A The injection interval?</p> <p>18 Q Yes. The injection interval.</p> <p>19 A I'm trying to think where to find it. Off the</p> <p>20 top of my head, I can't remember the exact depths.</p> <p>21 Q Is the top of your injection interval basically</p> <p>22 the top of the lower Cockfield?</p> <p>23 A Yes, ma'am.</p> <p>24 Q And you've testified before that the top of the</p> <p>25 lower Cockfield is at 6,045 feet. Is that correct?</p>	307	<p>1 was offered as.</p> <p>2 Q Okay. Do you remember giving some public</p> <p>3 interest opinions in the first testimony?</p> <p>4 A Honestly, sir, I mean, it's possible.</p> <p>5 Q Okay.</p> <p>6 A I just don't remember.</p> <p>7 Q Fair enough. Since your testimony in the first</p> <p>8 hearing, have you been asked -- or have you looked at</p> <p>9 any public interest issues in regards to the TexCom</p> <p>10 facilities?</p> <p>11 A No, sir; not that I can recall.</p> <p>12 Q Just to refresh your recollection, do you</p> <p>13 recall saying, "TexCom's proposed facility will provide</p> <p>14 a safe, efficient, risk-reducing wastewater disposal</p> <p>15 service that will serve in-state generators of</p> <p>16 nonhazardous waste, and I believe it is, therefore, in</p> <p>17 the public interest"?</p> <p>18 A Yes, sir.</p> <p>19 Q That's Page 54 of TexCom Exhibit 49.</p> <p>20 A Yes, sir.</p> <p>21 Q Have you looked at any issues in regards to</p> <p>22 what you were referring to in that section I just read</p> <p>23 to you since the last testimony you gave?</p> <p>24 A As far as the need for disposal capacity --</p> <p>25 Q Yes.</p>
306	<p>1 A Yes, that's correct.</p> <p>2 Q And your packer is set approximately 900 feet</p> <p>3 above the top of your injection interval?</p> <p>4 A That's correct.</p> <p>5 MS. MENDOZA: If I can have just one</p> <p>6 moment to make sure I don't have anything else to</p> <p>7 cover --</p> <p>8 (Brief pause)</p> <p>9 MS. MENDOZA: Thank you, Mr. Casey. We</p> <p>10 pass the witness.</p> <p>11 JUDGE WALSTON: Okay. The individual</p> <p>12 protestants, Mr. Forsberg?</p> <p>13 MR. FORSBERG: Thank you, Your Honor.</p> <p>14 CROSS-EXAMINATION</p> <p>15 BY MR. FORSBERG:</p> <p>16 Q Morning, Mr. Casey.</p> <p>17 A Morning.</p> <p>18 Q I apologize if a couple of these questions were</p> <p>19 already asked. I, frankly, haven't understood most of</p> <p>20 what's been talked about over the last couple of hours,</p> <p>21 but it's good to learn.</p> <p>22 You were offered in the first hearing as</p> <p>23 also providing some expertise on public interest issues.</p> <p>24 Is that correct?</p> <p>25 A I believe so. I don't remember exactly what I</p>	308	<p>1 A -- in the state?</p> <p>2 Q Yes.</p> <p>3 A Yes, sir. I worked on a couple of projects for</p> <p>4 a couple of municipalities where they --</p> <p>5 Q I'm sorry. Let me -- just to clarify, just</p> <p>6 with regard to TexCom.</p> <p>7 MR. RILEY: Well, let him finish the</p> <p>8 answer.</p> <p>9 MR. FORSBERG: I was trying to save --</p> <p>10 because I wasn't -- I was just asking about the TexCom</p> <p>11 facility. He can --</p> <p>12 JUDGE WALSTON: I'll allow him to clarify</p> <p>13 his question.</p> <p>14 Q (BY MR. FORSBERG) I'm just asking in regards</p> <p>15 to the TexCom facility, have you looked at any of the</p> <p>16 public interest factors with regards to the need for</p> <p>17 this specific facility in Montgomery County?</p> <p>18 A No, I have not.</p> <p>19 Q Were you present for Mr. Bost's testimony</p> <p>20 yesterday?</p> <p>21 A Yes, I was.</p> <p>22 Q Did you hear him testify about the hours of</p> <p>23 operation, as he understood them, for the TexCom</p> <p>24 facility?</p> <p>25 A Yes, sir.</p>

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309	<p>1 Q Do you recall that to be approximately -- I</p> <p>2 think he said around 16 hours was his understanding.</p> <p>3 A I believe that's what he said; yes, sir.</p> <p>4 Q Do you have any reason to dispute or do you</p> <p>5 have any information that suggests that that 16-hour</p> <p>6 number is incorrect?</p> <p>7 A None that I know of.</p> <p>8 Q Has anyone at TexCom ever advised you as to how</p> <p>9 many hours a day that facility is proposed to operate?</p> <p>10 A No, sir.</p> <p>11 Q Do you remember testifying that you -- at</p> <p>12 Page 38 of Exhibit 49 that you say, "I have rarely</p> <p>13 observed a Class I UIC well operator that operates for</p> <p>14 more than eight to ten hours per day"? Do you recall</p> <p>15 saying that?</p> <p>16 A Yes, sir.</p> <p>17 Q Do you have a different opinion about Class I</p> <p>18 UIC well operators today as you did when you gave this</p> <p>19 testimony?</p> <p>20 A Well, you know, a Class I operator is going to</p> <p>21 operate the number of hours they need to to handle the</p> <p>22 amount of waste that they get on any given day. I have</p> <p>23 facilities that I've worked with that at sometimes of</p> <p>24 the year, they're eight hours a day and sometimes</p> <p>25 they're 15 to 18 to 20 hours a day. It just depends on</p>	311	<p>1 location of where materials are going to be coming from</p> <p>2 that are going to be injected into the well?</p> <p>3 A No, sir.</p> <p>4 Q Do you have any opinion as to whether or not</p> <p>5 TexCom -- the proposed TexCom facility would accept</p> <p>6 waste from outside of Montgomery County?</p> <p>7 A I don't know where the waste comes from, sir.</p> <p>8 Q Do you agree with me that you previously</p> <p>9 testified -- and I can show it to you if you need me to,</p> <p>10 or if this refreshes your recollection, that the TexCom</p> <p>11 facility will serve in-state generators?</p> <p>12 A Yes, I believe that's what I said.</p> <p>13 Q Okay. When you said that, were you referring</p> <p>14 to only in-state generators within Montgomery County?</p> <p>15 A No. It was a general in -- anywhere within the</p> <p>16 state of Texas.</p> <p>17 Q So would you agree with me that it's likely</p> <p>18 that TexCom will be getting materials from outside of</p> <p>19 Montgomery County injected in the facility?</p> <p>20 A It is possible; yes, sir.</p> <p>21 Q When you say "possible," is that more than</p> <p>22 50 percent likely? Can you narrow it down a little bit?</p> <p>23 A No. Without -- you know, that's all, you know,</p> <p>24 in operation of the facility and who they talk to and</p> <p>25 who sends them the waste. It's nothing that I have any</p>
310	<p>1 the workload, per se, of waste being sent to the</p> <p>2 facility.</p> <p>3 Q And you have observed hours of operation at</p> <p>4 approximately how many facilities?</p> <p>5 A I would say at least five, if not six</p> <p>6 facilities.</p> <p>7 Q Have you ever seen a facility operate at 16</p> <p>8 hours a day, 365 days a year?</p> <p>9 A No, sir. Can I clarify that?</p> <p>10 Q Yes.</p> <p>11 A It depends on the type of facility, but I have</p> <p>12 seen facilities that operate 24 hours a day seven days a</p> <p>13 week.</p> <p>14 Q How about a Class I UIC facility?</p> <p>15 A Yes, sir; Class I UIC facilities that operate</p> <p>16 24 hours a day.</p> <p>17 Q Seven days a week?</p> <p>18 A Seven days a week.</p> <p>19 Q Do you have any reason to believe that the</p> <p>20 TexCom facility is going to operate at that rate?</p> <p>21 A I know they would love to in order to make that</p> <p>22 much money but, you know, in reality, most work will be</p> <p>23 done during the, you know, ten- to 16-hour range.</p> <p>24 Q Do you have any information or has anyone from</p> <p>25 TexCom ever provided you any information as to the</p>	312	<p>1 knowledge of.</p> <p>2 Q Do you have your prefiled testimony from this</p> <p>3 remand hearing in front of you, Exhibit 84?</p> <p>4 A Yes, sir.</p> <p>5 Q If you could, turn to Page 5, please.</p> <p>6 A Okay.</p> <p>7 Q The second line it states, "As I previously</p> <p>8 testified, the fault movement probably caused smearing</p> <p>9 of the clay on the formation."</p> <p>10 Can you be any more specific as to what</p> <p>11 you mean by "probably"?</p> <p>12 A Well, not really. I mean, it's -- you know, I</p> <p>13 can't see 6,000 feet below ground but --</p> <p>14 Q Thanks for clarifying.</p> <p>15 A It's a little tough. But, you know, when you</p> <p>16 have a shale layer moving as a sand, you will have</p> <p>17 grains of shale that get caught in the grains of the</p> <p>18 sandstone. So it -- you know, it's like rubbing chalk</p> <p>19 on concrete. It leaves a mark basically.</p> <p>20 Q Okay. Do we have any idea of how thick that</p> <p>21 mark is?</p> <p>22 A No, sir.</p> <p>23 Q So does "probably" mean more than 50 percent</p> <p>24 likely or anywhere between zero and 100 percent likely?</p> <p>25 A Anywhere between zero and 100, depending</p>

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313	<p>1 exactly where you are on the face of the fault.</p> <p>2 Q So there are just as likely places that have no</p> <p>3 clay smearing as there are places that have a high</p> <p>4 degree of clay smearing?</p> <p>5 A That's the potential; yes, sir.</p> <p>6 Q And if there are places that have zero clay</p> <p>7 smearing, then that would not serve as any inhibition to</p> <p>8 a wastestream traveling through it?</p> <p>9 A Correct.</p> <p>10 Q I'm just trying to clarify in my own mind. You</p> <p>11 believe that a wastestream could -- you believe there is</p> <p>12 horizontal transmissivity at the 4,400 fault?</p> <p>13 A Yes, sir.</p> <p>14 Q Within that belief, do you believe that</p> <p>15 material could migrate, then, up from the lower</p> <p>16 Cockfield to the middle to the upper?</p> <p>17 MR. RILEY: Objection. I think -- I</p> <p>18 apologize, counsel. "Material," are we talking</p> <p>19 injectate or other --</p> <p>20 MR. FORSBERG: Yes.</p> <p>21 MR. RILEY: I think that's important to be</p> <p>22 clear on this answer.</p> <p>23 MR. FORSBERG: Fair enough.</p> <p>24 Q (BY MR. FORSBERG) Do you believe, then, that</p> <p>25 Class I UIC material, if it reached the fault, which I'm</p>	315	<p>1 migration.</p> <p>2 Q And that's a fairly specific picture of what's</p> <p>3 going on down there. As I recall, you can't physically</p> <p>4 see down there. Right?</p> <p>5 A Right. But the log shows a number of shale</p> <p>6 sand sequences inside each member of the Cockfield</p> <p>7 formation, and just like -- you know, as an example, in</p> <p>8 the upper Cockfield, there's, you know, like, six</p> <p>9 Cockfield sands where they have identified various</p> <p>10 producing intervals, and so the little shale lenses</p> <p>11 between those intervals have prevented the oil from</p> <p>12 migrating upward over time.</p> <p>13 Q So there's a way that you could confirm that</p> <p>14 lack of migration in those areas?</p> <p>15 A Not specifically; no, sir.</p> <p>16 Q Although the permeability, I believe you</p> <p>17 testified, becomes less and less likely that the</p> <p>18 injected material could travel from the lower to the</p> <p>19 upper because the permeability is different. Correct?</p> <p>20 A Can you restate your question? It's not clear.</p> <p>21 Q I believe you stated that if the fluid got to</p> <p>22 the fault, the injected fluid, that it could</p> <p>23 horizontally be transmissive through the fault line and</p> <p>24 that it could potentially go up into the middle</p> <p>25 Cockfield, but you doubt it because of the permeability</p>
314	<p>1 not saying you agree that it would, but if it reached</p> <p>2 the fault, it could travel horizontally from the lower</p> <p>3 to the middle and to the upper Cockfield?</p> <p>4 A I believe, you know, if -- like you said, I</p> <p>5 don't believe the waste will reach the fault, but if it</p> <p>6 did, it would go horizontally across the fault.</p> <p>7 Vertical permeability is significantly less than</p> <p>8 horizontal, so the upper migration would be, you know, a</p> <p>9 lot harder to achieve once you've reached the higher</p> <p>10 permeability sands of the middle Cockfield.</p> <p>11 Q But would you agree with me that there would be</p> <p>12 no shale layer to protect at the fault from the</p> <p>13 migration from the lower to the middle Cockfield?</p> <p>14 A You have a shale layer at the top of the middle</p> <p>15 Cockfield.</p> <p>16 Q But there is a gap at the fault between the</p> <p>17 shale where the fault has slipped?</p> <p>18 A Right. But there is -- you know, your vertical</p> <p>19 permeability even inside the sandstone is less than</p> <p>20 horizontal permeability, and as has been stated in the</p> <p>21 record is that the sand layers are not just pure sand.</p> <p>22 There's shale and sand mixed, and so you get -- your</p> <p>23 vertical permeability is significantly less. So you</p> <p>24 have all these individual little sand lenses -- or</p> <p>25 excuse me -- shale lenses that are preventing the upward</p>	316	<p>1 of the middle Cockfield?</p> <p>2 A Right. With the higher permeability of the</p> <p>3 middle Cockfield, any of the pressure that you would</p> <p>4 have to push it upwards dissipates.</p> <p>5 Q So what's it's going to depend -- with the</p> <p>6 increased permeability on the injectable material or</p> <p>7 injected material from traveling north is going to be</p> <p>8 the pressure that's being exerted on that injected</p> <p>9 material?</p> <p>10 A Right. You've got the pressure on the</p> <p>11 material, and then you have the vertical permeability</p> <p>12 that inhibits upper flow.</p> <p>13 Q Have you done any calculations or investigation</p> <p>14 into how Denbury's proposed operations may affect</p> <p>15 pressure on the lower and middle Cockfield at the 4,400</p> <p>16 fault?</p> <p>17 A No, I don't have the various pressure</p> <p>18 informations.</p> <p>19 Q Would that be something you would want to</p> <p>20 consider if it was shown that Denbury's operations would</p> <p>21 create increased pressure?</p> <p>22 Would that be significant to you?</p> <p>23 A Their increased pressure could cause our -- you</p> <p>24 know, inhibit our flow from going upward. Their</p> <p>25 increased pressure would cause pressure downward over</p>

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317	<p>1 time.</p> <p>2 As to how it would affect us, I don't</p> <p>3 believe there will be a net effect. I don't believe</p> <p>4 their pressure will impact us at our injection zone --</p> <p>5 or excuse me -- injection interval.</p> <p>6 Q Now, you provided some testimony in regards to</p> <p>7 a plume. Is that correct?</p> <p>8 A Yes, sir.</p> <p>9 Q What is the plume?</p> <p>10 A The plume is the injected waste fluid in the</p> <p>11 injection interval.</p> <p>12 Q Is it sort of the pool that gets created</p> <p>13 underground of the injection material?</p> <p>14 A Right. It's the waste that displaces the</p> <p>15 native brine that's in the formation.</p> <p>16 Q Is that pool a perfect circle?</p> <p>17 A Not specifically. It will be, you know, the</p> <p>18 semblance of a circle.</p> <p>19 Q Are there any sorts of channels, streams that</p> <p>20 run through the plume?</p> <p>21 A Not that I know of.</p> <p>22 Q If there were channels or streams or anything</p> <p>23 running through the plume, would that be of concern?</p> <p>24 A If there was a specific channel that -- you</p> <p>25 know, you would have to see if it made a difference on</p>	319	<p>1 A I don't believe the pressure sink at the top of</p> <p>2 the upper Cockfield would have any impact below the</p> <p>3 middle Cockfield.</p> <p>4 Q But, again, you don't have any information with</p> <p>5 regards to Denbury's potential activities at the site</p> <p>6 and how that might affected those pressures?</p> <p>7 A No specific numbers; no, sir.</p> <p>8 Q Could you turn to Page 11 of your prefiled</p> <p>9 testimony, Exhibit 84, please?</p> <p>10 A Okay.</p> <p>11 Q On Lines 19 through 21, you state,</p> <p>12 "Additionally, as of the early 1930s, the standard</p> <p>13 practice for abandoning oil wells was to plug them with</p> <p>14 cement. Therefore, regardless of any particular well</p> <p>15 depths, if it is abandoned, it is almost certainly</p> <p>16 plugged with cement."</p> <p>17 A That's what it says; yes, sir.</p> <p>18 Q How do you come to that conclusion, that it was</p> <p>19 almost certainly plugged with cement?</p> <p>20 A Just from historical work in the oil field and</p> <p>21 review of plugging records and re-entering old wells.</p> <p>22 Q Can you explain to me what "almost certainly"</p> <p>23 means in your mind?</p> <p>24 A It means there's a reasonable -- what's the</p> <p>25 best way to say this?</p>
318	<p>1 where the waste went to.</p> <p>2 Q A channel running or a pathway, it may create</p> <p>3 a -- excuse me.</p> <p>4 A channel could create a pathway for the</p> <p>5 injected material to travel somewhere outside of the</p> <p>6 plume. Is that correct?</p> <p>7 A Right. If you had an area of higher perm,</p> <p>8 there's potential you could move a little further that</p> <p>9 direction, but it wouldn't be a significant difference.</p> <p>10 Q Have you done any calculations or investigation</p> <p>11 to account for the potential -- potentiality of channels</p> <p>12 running through the plume?</p> <p>13 A Based on the geology work done by Dr. Langhus,</p> <p>14 we haven't seen any changes, per se.</p> <p>15 Q Do you know what a pressure sink is?</p> <p>16 A In basic terms, yes.</p> <p>17 Q What is that, as you understand it?</p> <p>18 A It's just an area of low pressure.</p> <p>19 Q Do you know if a pressure sink could cause the</p> <p>20 differential to push material or injected material up,</p> <p>21 as a opposed to down?</p> <p>22 A With the vertical perm issue, it depends on how</p> <p>23 much -- you know, are you specifically talking about it</p> <p>24 at the TexCom facility?</p> <p>25 Q Yes.</p>	320	<p>1 If the wells were there and they were</p> <p>2 plugged, they were most likely plugged with cement.</p> <p>3 Q If you could, turn to Page 14 for me of</p> <p>4 Exhibit 84. At Line 18, you state, "Despite the lack of</p> <p>5 well records" -- you would agree that there is a lack of</p> <p>6 well records for many of the wells in the area of the</p> <p>7 TexCom facility. Correct?</p> <p>8 A You know, I would have to go back and look, but</p> <p>9 I believe we located almost all the well records.</p> <p>10 Q Well, you state there's some lack of well</p> <p>11 records. That's your testimony?</p> <p>12 A There are a few that are missing, yes.</p> <p>13 Q You state on Line 20 that the Conroe oil field</p> <p>14 has had a single operator for its entire existence. Is</p> <p>15 that correct?</p> <p>16 A Correct. Yes, sir.</p> <p>17 Q Where do you get your information for that</p> <p>18 statement?</p> <p>19 A It came from the unitization work done by Exxon</p> <p>20 back in -- I believe it was the '70s.</p> <p>21 Q So the Conroe oil field existed since when?</p> <p>22 A I believe it was first drilled in the '30s.</p> <p>23 Q So you're saying that the Conroe oil field had</p> <p>24 one operator since the '30s?</p> <p>25 A It's had a few initial operators, and then</p>

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<p style="text-align: right;">321</p> <p>1 Exxon basically took over the field. I don't remember</p> <p>2 the exact date when Exxon took over most of the</p> <p>3 operations.</p> <p>4 Q So your testimony on Line 20 of Page 14 that</p> <p>5 the Conroe oil field has had a single operator for its</p> <p>6 entire existence is incorrect?</p> <p>7 A Specifically, yes. I mean, it's -- for the</p> <p>8 life of the field -- or a few guys initially drilled a</p> <p>9 few wells, but Exxon has pretty much run the field since</p> <p>10 it became a true oil field.</p> <p>11 Q Is Exxon currently running the field?</p> <p>12 A No, they do not.</p> <p>13 Q How long has it been since Exxon has run the</p> <p>14 field?</p> <p>15 A I don't remember when Wapati bought the field</p> <p>16 from Exxon. I don't remember the exact date. It was a</p> <p>17 few years ago, and then since then, Denbury has bought</p> <p>18 out Wapati's operations.</p> <p>19 Q Okay. Would you agree with me that Wapati and</p> <p>20 Exxon are different operators?</p> <p>21 A Yes, they are.</p> <p>22 Q And you knew that when you said that the Conroe</p> <p>23 oil field has had a single operator for its entire</p> <p>24 existence?</p> <p>25 A Well, "single" as in it's been -- when it's</p>	<p style="text-align: right;">323</p> <p>1 up -- I mean, Exxon had operations prior to unitization.</p> <p>2 I don't remember the exact dates.</p> <p>3 Q If you could, turn to Page 13, please, of</p> <p>4 Exhibit 84. You make reference to four wells not</p> <p>5 completed in the upper Cockfield, C-57, C-82, C-461 and</p> <p>6 RM-5.</p> <p>7 A Yes, sir.</p> <p>8 Q And you conclude that they are dry holes that</p> <p>9 were plugged with cement?</p> <p>10 A That's correct.</p> <p>11 Q Are those -- were those plugged correctly with</p> <p>12 cement?</p> <p>13 A As far as I know, they were, sir.</p> <p>14 Q What have you done to confirm how they were</p> <p>15 plugged?</p> <p>16 A I mean, we pulled well records, and they showed</p> <p>17 to be plugged with cement so --</p> <p>18 Q Would it be at all important as to the depth of</p> <p>19 those plugs?</p> <p>20 A Yes.</p> <p>21 Q Why would the depth of those plugs be</p> <p>22 important?</p> <p>23 A Well, you want to make sure that they're</p> <p>24 plugged at the upper Cockfield and above the upper</p> <p>25 Cockfield and below the freshwater.</p>
<p style="text-align: right;">322</p> <p>1 been operated, it's just been one company. I'm not</p> <p>2 saying, like, Exxon is -- you know, Exxon, Wapati and</p> <p>3 Denbury, they all operate the whole field. That's the</p> <p>4 intent of the statement. It's not intended to say just</p> <p>5 one guy has run it the whole time -- one company. It's</p> <p>6 unitized operations under one company.</p> <p>7 Q How long has it been unitized?</p> <p>8 A I believe unitization was in the '70s, I</p> <p>9 believe.</p> <p>10 Q You've reviewed the well records in the area of</p> <p>11 review. Correct?</p> <p>12 A Yes, sir.</p> <p>13 Q I mean, would it surprise you if there are</p> <p>14 dozens of operators listed on the various well records?</p> <p>15 A No. There's a number of companies listed.</p> <p>16 Q Would it surprise you if it's dozens?</p> <p>17 A I don't know the exact number; no, sir.</p> <p>18 Q But you still felt comfortable to say that the</p> <p>19 Conroe oil field had a single operator for its entire</p> <p>20 existence?</p> <p>21 A For the bulk of its existence; yes, sir, there</p> <p>22 has been single operator.</p> <p>23 Q So from the '70s to now is, I guess, the bulk</p> <p>24 of its existence?</p> <p>25 A I don't remember exactly when Exxon picked</p>	<p style="text-align: right;">324</p> <p>1 Q What have you done to confirm that C-57, C-82,</p> <p>2 C-461 and Well RM-5 are plugged as you just stated above</p> <p>3 the upper Cockfield?</p> <p>4 A Specifically I don't remember exactly what I</p> <p>5 have done. I mean, I could look at the well records</p> <p>6 but --</p> <p>7 Q If evidence showed that those cement plugs in</p> <p>8 those wells were not plugged above the upper Cockfield</p> <p>9 but were plugged, say, within one of the USDWs, would</p> <p>10 that have concern for you?</p> <p>11 A Depends on where the well is exactly located as</p> <p>12 to whether it would be of concern.</p> <p>13 Q A well within the area of review.</p> <p>14 A Well, based on our belief that the fault is</p> <p>15 nontransmissive in our area of review, from a pressure</p> <p>16 standpoint is significantly less than two and a half</p> <p>17 miles. So wells out two and a half miles would not be</p> <p>18 of a concern.</p> <p>19 Q Do you know where Wells C-57, 82, 461 and MR-5</p> <p>20 are located?</p> <p>21 A Off the top of my head; no, sir.</p> <p>22 Q Are they indicated in any of the maps in your</p> <p>23 report?</p> <p>24 A I believe they're the maps that went with the</p> <p>25 well records.</p>

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325	<p>1 Q Do you have that in front of you?</p> <p>2 A Possibly.</p> <p>3 MR. RILEY: While everyone is shuffling,</p> <p>4 I'm going to take my leave since we're close to the noon</p> <p>5 hour, so thank you, Judge.</p> <p>6 Q (BY MR. FORSBERG) Did you locate a well map?</p> <p>7 A Yes, I did.</p> <p>8 Q Can you locate on that map Wells C-57, 82 and</p> <p>9 461?</p> <p>10 (Brief pause)</p> <p>11 Q (BY MR. FORSBERG) Have you located a couple of</p> <p>12 those wells?</p> <p>13 A I've got a couple of them.</p> <p>14 Q Let's just start with the ones you found.</p> <p>15 Which numbers?</p> <p>16 A I've got 57 -- or I had 57. Where did it go?</p> <p>17 Q Approximately how far from the proposed TexCom</p> <p>18 facility is C-57?</p> <p>19 A Hang on. I lost it again. I would say --</p> <p>20 approximately two miles would be my guess.</p> <p>21 Q Would you have any concern about the cement</p> <p>22 plugging depth on C-57 based upon its distance from the</p> <p>23 proposed TexCom facility?</p> <p>24 A Not based on, you know, our original modeling;</p> <p>25 no, sir.</p>	327	<p>1 Q Did the proposed Denbury operations change the</p> <p>2 pressures?</p> <p>3 A I don't know what their pressures are going to</p> <p>4 be adding to the formation, so I can't speculate at this</p> <p>5 point in time.</p> <p>6 Q But could it change it?</p> <p>7 A I don't think they will have an effect in the</p> <p>8 lower Cockfield where we're going to be injecting.</p> <p>9 Q And what do you base that opinion on?</p> <p>10 A Just the vertical permeabilities and the high</p> <p>11 permeability zone they're injecting into.</p> <p>12 Are we done with the map?</p> <p>13 Q Yes. Back at the bottom -- bottom of Page 14</p> <p>14 of Exhibit 84, beginning on Line 21, mid-sentence, you</p> <p>15 say, "There was a strong economic" -- and then you</p> <p>16 continue to Page 15 -- "incentive to plug deeper, dry</p> <p>17 holes back to the upper Cockfield so as to prevent the</p> <p>18 inward flow of brine from the lower zones."</p> <p>19 A Correct.</p> <p>20 Q What material are you using or relying upon to</p> <p>21 make that statement?</p> <p>22 A Well, if you had a producing well that was open</p> <p>23 to a lower zone, you could potentially pull brine from</p> <p>24 there rather than oil from your upper zone.</p> <p>25 Q Well, did you do any investigation into the</p>
326	<p>1 Q Would anything other than your modeling cause</p> <p>2 you concern?</p> <p>3 A We're not going to have any effect at that</p> <p>4 distance, so I would see no concern with the well.</p> <p>5 Q What other well did you look at?</p> <p>6 A C-82.</p> <p>7 Q How far from the proposed TexCom facility is</p> <p>8 C-82?</p> <p>9 A Just under a mile.</p> <p>10 Q Would you have any concern about the well plug</p> <p>11 depth of C-82 in relation to its distance from the</p> <p>12 proposed TexCom facility?</p> <p>13 A No, not based on our initial modeling effort;</p> <p>14 no, sir.</p> <p>15 Q How about based upon any other reason?</p> <p>16 A Based on modeling, we don't have an effect at</p> <p>17 that distance to cause upward flow into the USDW, so it</p> <p>18 would not be a well of concern at that point.</p> <p>19 Q At what distance do you begin to have concern</p> <p>20 about cement plugs within wells?</p> <p>21 A Well, it would be the distance away from the</p> <p>22 well that we -- I would have to look at the original</p> <p>23 application, but the cone of influence pressure that we</p> <p>24 calculate in the original application. I believe that</p> <p>25 distance is only -- I believe it's under 500 feet.</p>	328	<p>1 economics of any of the dozens of entities that appear</p> <p>2 on various well records?</p> <p>3 A No, sir.</p> <p>4 Q Do you have any understanding of the sort of</p> <p>5 mom-and-pop operations that were drilling wells in</p> <p>6 the '30s, '40s and '50 and '60s in the Conroe oil field?</p> <p>7 A General information on them.</p> <p>8 Q Does it cost money to fill those holes, the dry</p> <p>9 holes?</p> <p>10 A It costs money to plug them, yes, but if you</p> <p>11 were producing and you didn't plug the lower zone, you</p> <p>12 wouldn't make any oil if you didn't pull water.</p> <p>13 Q But do we know if those companies actually</p> <p>14 plugged those holes?</p> <p>15 A That was pretty much standard practice.</p> <p>16 Q For who, the single operator in the oil field?</p> <p>17 A Or operators, yes.</p> <p>18 Q How many operators can you identify from the</p> <p>19 Conroe oil field since its inception?</p> <p>20 A Off the top of my head, I couldn't tell you.</p> <p>21 Q So how do you know what their standard practice</p> <p>22 is?</p> <p>23 A Standard oil field practice was to plug wells.</p> <p>24 Q Do you know if some wells have never been</p> <p>25 plugged?</p>

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329	<p>1 A I'm sure there's a few that's slipped through</p> <p>2 the cracks over time.</p> <p>3 Q Further down on Page 15, starting on Line 7,</p> <p>4 you say that, "There were abandoned wells that had been</p> <p>5 drilled through the Jackson formation and that lacked</p> <p>6 adequate casing and were not plugged with cement. They</p> <p>7 would not have been able to withstand the pressures</p> <p>8 exerted by the surrounding mud stone in the Jackson</p> <p>9 formation and would have collapsed in a matter of</p> <p>10 years." Is that your opinion?</p> <p>11 A Yes, sir.</p> <p>12 Q On what information do you base that opinion?</p> <p>13 A There's been some borehole closure work done by</p> <p>14 EPA back in the '80s that I was partially involved with</p> <p>15 with the company I was with, and they actually went into</p> <p>16 wells and put pressure sensors down in there and then</p> <p>17 did measurements to kind of monitor borehole closure to</p> <p>18 see what the effect was, and the general answer was, you</p> <p>19 know, in a thick shale formation such as the Jackson</p> <p>20 shale, the holes would close in over time.</p> <p>21 Q Were those boreholes out of the Conroe oil</p> <p>22 field?</p> <p>23 A No. The study was not done in the Conroe oil</p> <p>24 field.</p> <p>25 Q Have you done anything in the Conroe oil field</p>	331	<p>1 readings and saw the pressure differential between the</p> <p>2 sampling points.</p> <p>3 Q So is that a published study?</p> <p>4 A I believe so. Off the top of my head, I don't</p> <p>5 remember the name of it. That was back when I was a</p> <p>6 very young engineer.</p> <p>7 Q So other than the study that you can't recall</p> <p>8 the name of, is there any other information on which</p> <p>9 you're relying on for that opinion?</p> <p>10 A Just problems drilling through shale over time.</p> <p>11 It tends to slough off on you in a lot of cases.</p> <p>12 Q How many times have you dug through the shale</p> <p>13 in the Conroe oil field?</p> <p>14 A I have not drilled a well in the Conroe oil</p> <p>15 field.</p> <p>16 MR. FORSBERG: Pass the witness, Your</p> <p>17 Honors. Thank you.</p> <p>18 JUDGE WALSTON: Mr. Walker?</p> <p>19 MR. WALKER: I do have some questions,</p> <p>20 Your Honors. I expect it's going to last more than</p> <p>21 three minutes.</p> <p>22 JUDGE WALSTON: How long do you think it</p> <p>23 will last?</p> <p>24 MR. WALKER: Well, not too awfully long,</p> <p>25 maybe 15 or 20. I apologize but --</p>
330	<p>1 to confirm that any wells have caved in on themselves</p> <p>2 below the cement plugging?</p> <p>3 A No, I have not.</p> <p>4 Q How long would it take for that event to occur</p> <p>5 where they collapse?</p> <p>6 A It's hard to say. In the studies that were</p> <p>7 done, it was usually within a year.</p> <p>8 Q Did it sometimes take longer?</p> <p>9 A Yes, sir.</p> <p>10 Q Once the hole falls, I guess, how would you</p> <p>11 describe it? Does it fall in on itself or cave in?</p> <p>12 A Basically the walls would just, you know, start</p> <p>13 sloughing off into the -- on itself until it -- you</p> <p>14 know, it's like you dig a hole in the sand. It</p> <p>15 eventually all falls back in on you.</p> <p>16 Q Does the material that fills the hole have the</p> <p>17 same permeability as the original material?</p> <p>18 A Over time, it would be close to the same</p> <p>19 permeability. It would be a little less, but it would</p> <p>20 still be significantly higher than a sand would be.</p> <p>21 Q And over time, how much time are we talking</p> <p>22 about?</p> <p>23 A Probably within a few years.</p> <p>24 Q And what do you base that on?</p> <p>25 A The same study. You know, they did pressure</p>	332	<p>1 JUDGE WALSTON: That's fine.</p> <p>2 MR. WALKER: -- they got into areas that I</p> <p>3 began to understand.</p> <p>4 (Laughter)</p> <p>5 MR. LEE: Your Honor, we're also going to</p> <p>6 have some amount of redirect. Our suggestion would be</p> <p>7 to go ahead and stop now, and Mr. Casey is going to have</p> <p>8 to come back tomorrow anyway.</p> <p>9 JUDGE WALSTON: That will be fine. And as</p> <p>10 we discussed yesterday, we're going to recess for today</p> <p>11 due to Mr. Riley's conflict.</p> <p>12 So we'll recess and resume tomorrow at</p> <p>13 9 a.m. We'll go off the record.</p> <p>14 (Proceedings recessed at 11:57 a.m.)</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>

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